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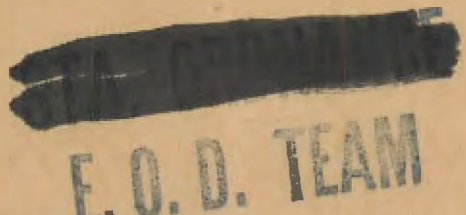
BRITISH, FRENCH AND ITALIAN MINE WARFARE EQUIPMENT



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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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This manual supersedes chapters 6, 7, and 10, FM 5-31, 1 November 1943

BRITISH, FRENCH AND ITALIAN MINE WARFARE EQUIPMENT

DEPARTMENT OF THE ARMY • MAY 1952

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DEPARTMENT OF THE ARMY
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Chief of Staff, United States Army

OFFICIAL:
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PART ONE

INTRODUCTION OF FOREIGN MINE WARFARE EQUIPMENT

Chapter 1

GENERAL

1. Scope and Purpose

a. This manual is the fourth in a series of manuals containing detailed technical information on foreign mine warfare equipment. This manual covers mine warefare equipment used by the British, French, and Italians in World War II. The various types of fuzes; mines; antilifting devices; booby traps; mine laying, marking, and recording equipment and supplies; and mine detecting and clearing equipment are described and illustrated. TM 5–223A, Soviet Mine Warfare Equpiment, TM 5–223B, Oriental and European (Except British, French, German, Italian, and Soviet) Mine Warfare Equipment, and TM 5–223C, German Mine Warfare Equipment, are the first three manuals.

b. The series of manuals on foreign mine warfare equipment is a basic guide to be used in the identification and employment of foreign mine warfare equipment and for the neutralization of foreign mines and fuzes.

c. Information on foreign mine warfare policies and tactics is contained in FM 5–32.

d. Although the camouflage operation is not outlined in the installing and arming procedures it will be accomplished at all times. The major portion of the data presented is based on captured documents, intelligence reports, and information obtained through liaison with other allied forces during World War II. Wherever possible, information in this manual is based on actual pieces of equipment. Any reader possessing information that modifies the data contained in this manual, or who encounters mine warfare equipment not discussed herein, should forward such information to:

Assistant Chief of Staff, G–2
Washington 25, D. C.
or
Chief of Engineers
Washington 25, D. C.
ATTN: Engineer Intelligence Division

2. Development of Mine Warfare

Originally mine warfare consisted of tunneling beneath the enemy and using explosives to destroy otherwise impenetrable positions. This type of mine warfare continued through World War I. During the latter part of World War I, when tanks made their appearance, both the Germans and the Allies began to use land mines constructed of artillery shells. The importance of mine warfare was not definitely established until World War II. Large mine fields placed in key locations helped the British hold back the Germans in North Africa. Extensive use of mines by the Soviet Army contributed materially to delaying the German advance into Russia. Mines were also extensively used in the fighting in Italy and during campaigns in France and Germany. In Korea mines have been employed extensively.

3. Mine Terminology

a. A *mine* is an encased charge of explosive placed under water, laid on the ground, or buried. To detonate the mine, it is necessary to provide one or more detonating devices. The elements of a mine are shown in figure 1. The types of mines used in foreign mine warfare are discussed in paragraph 5.

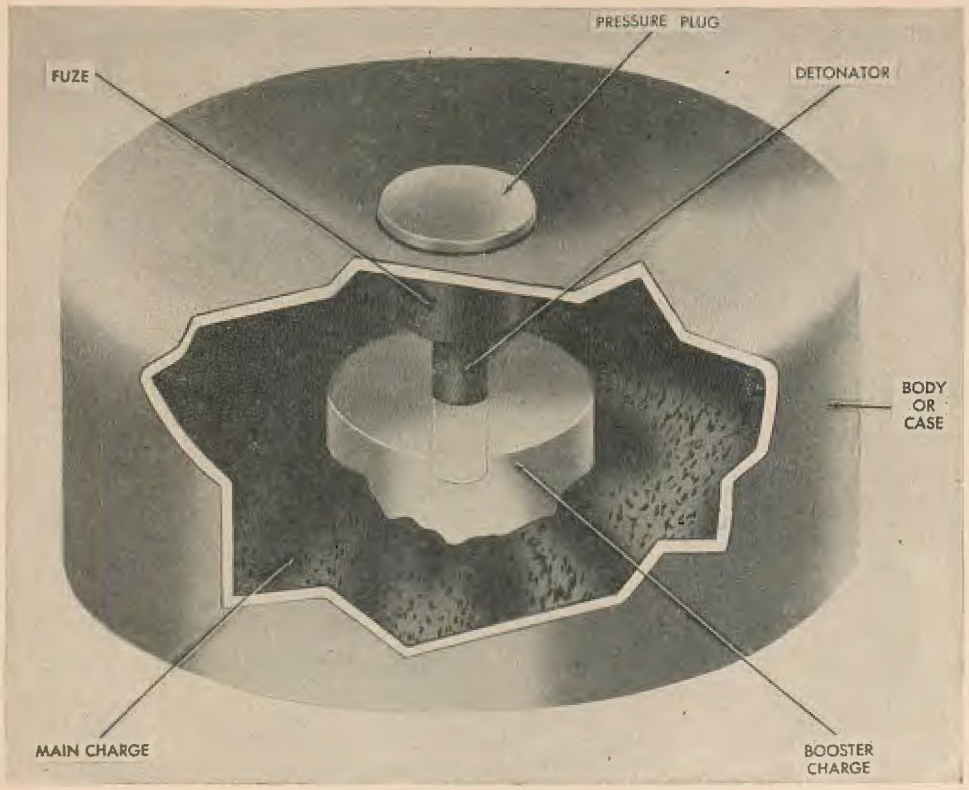

Figure 1. Elements of a mine.

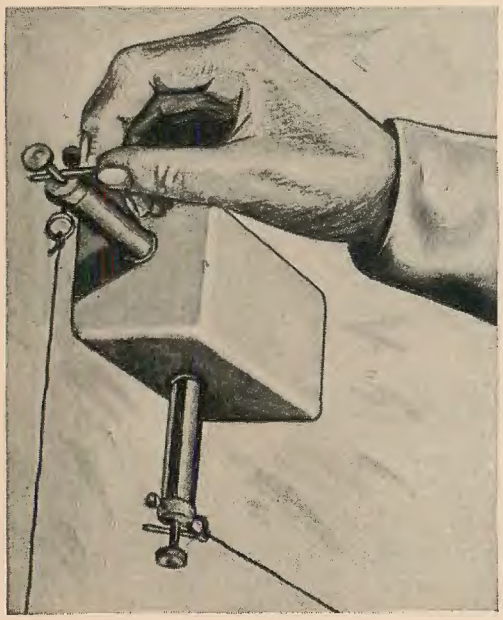

Figure 2. Arming a mine.

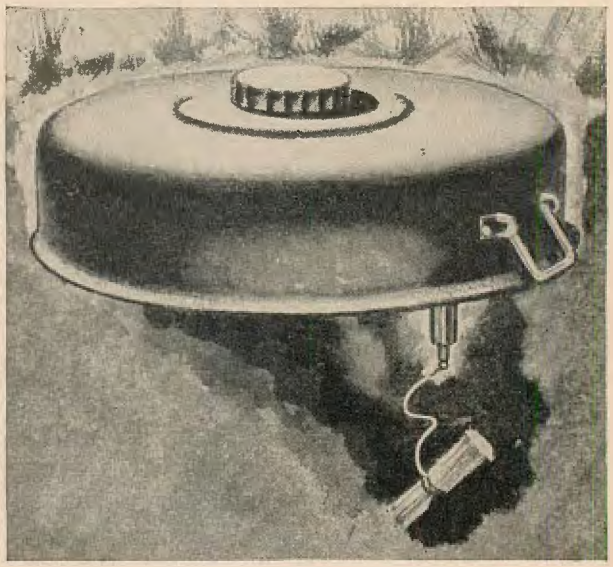

Figure 3. Activated mine.

b. A *fuze* is a mechanical, chemical, or electrical device which starts the firing chain of a mine (par. 4). Fuzes are classified according to use (instantaneous or delayed-action), the type of initiating action required to start the fuze functioning (par. 4*a*), and the internal action which produces the flame or spark (par. 4*b*).

c. Installing the Fuze is the insertion of the detonator and fuze assemblies into a mine.

d. Arming is the removal of all safety devices so the mine is ready to function (fig. 2).

e. Neutralizing is rendering a mine ineffective.

f. An *activated mine* has a secondary fuze which will cause detonation when the mine is moved. The device can be attached either to the mine itself or to a second mine or auxiliary charge beneath or beside the mine (fig. 3).

g. Sympathetic detonation is the detonation of one or more charges induced by the explosion of another charge (fig. 4).

h. The *effective casualty radius of a mine* is that radius within which 50 percent of all personnel will become casualties when a mine is detonated. It is expressed in yards.

i. The *danger area of a mine* is that area within which fragments of a mine may produce casualties; however, personnel in this area, but outside the effective casualty radius, are relatively safe.

4. Firing Chain of a Mine

(fig. 5)

a. Initiating Action. Personnel or vehicles, including tanks, initiate the action in the fuze by one of the following methods (fig. 6):

(1) *Pressure* on the fuze (fig. 6).

(2) *Pull* on a pin or pull ring attached to the fuze by means of a trip wire (fig. 6).

(3) *Pressure release* by removing an object from a compressed spring-actuated lever or plunger (fig. 6).

(4) *Tension release* by cutting a taut wire tied to a compressed spring-actuated striker (fig. 6).

(5) *Setting delayed-action mechanism* to actuate a fuze. This is normally accomplished by setting a clock mechanism for a desired time delay in the actuation of

Figure 4. Sympathetic detonation of mines.

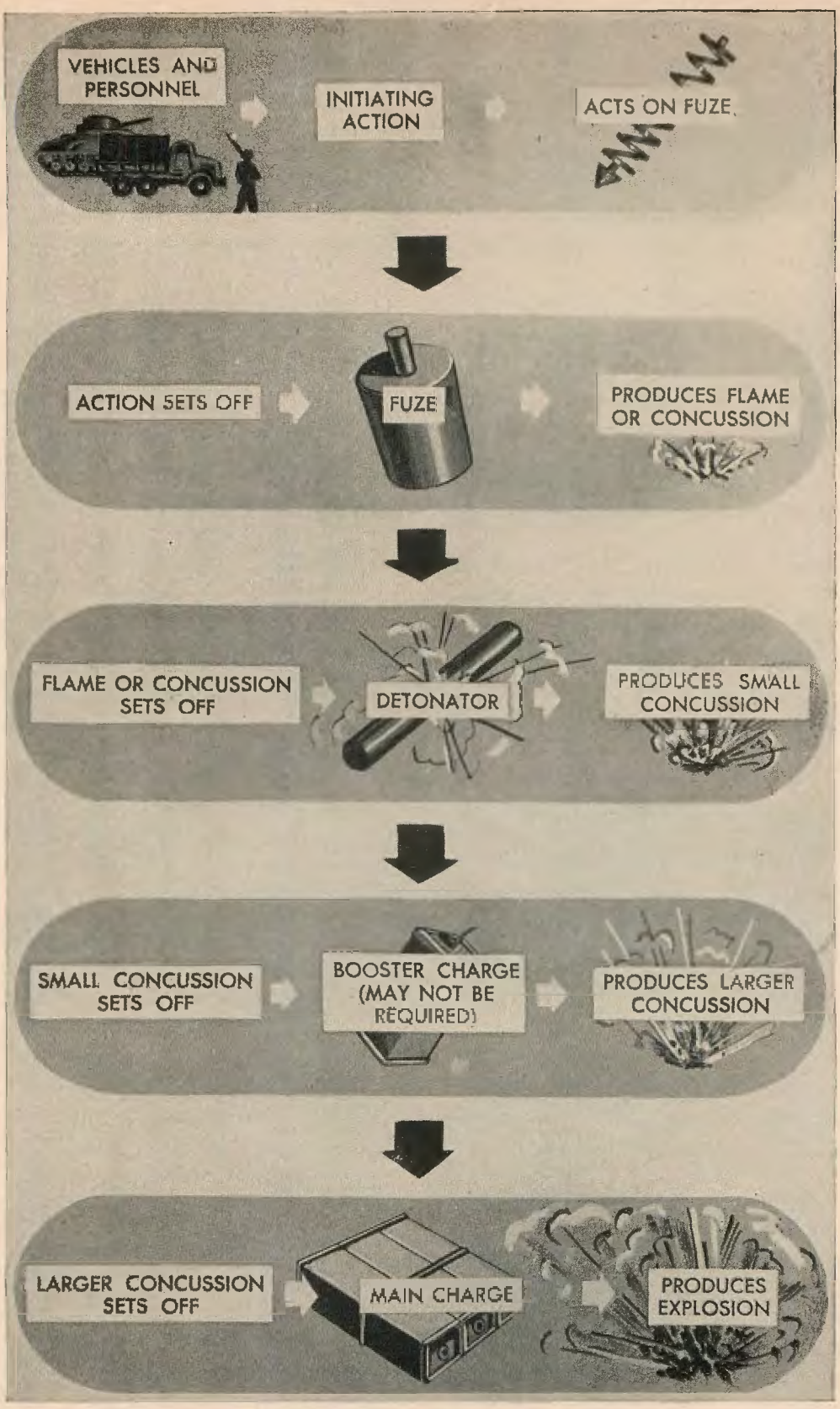

Figure 5. Firing chain of a mine.

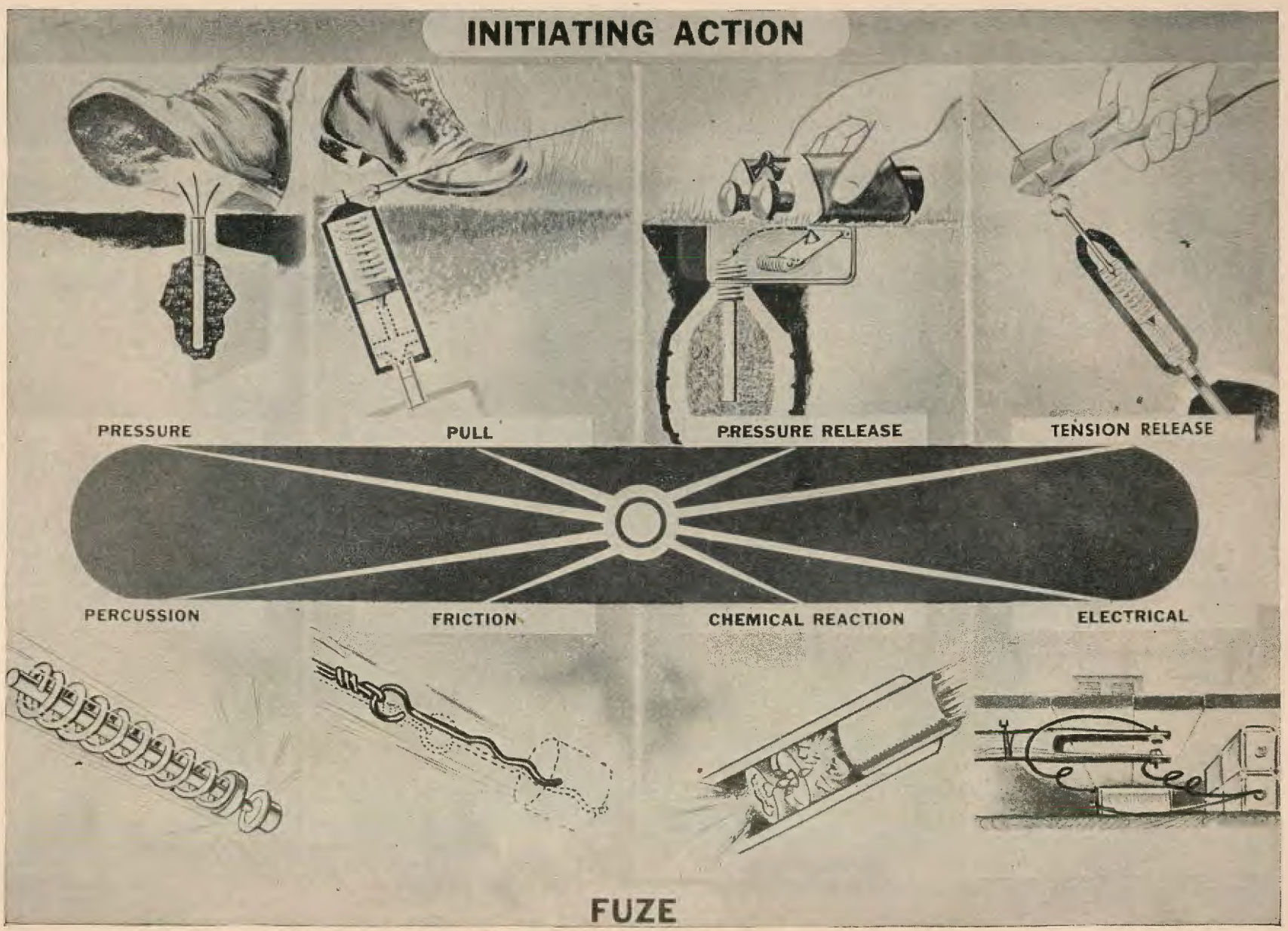

Figure 6. Various initiating actions and fuzes.

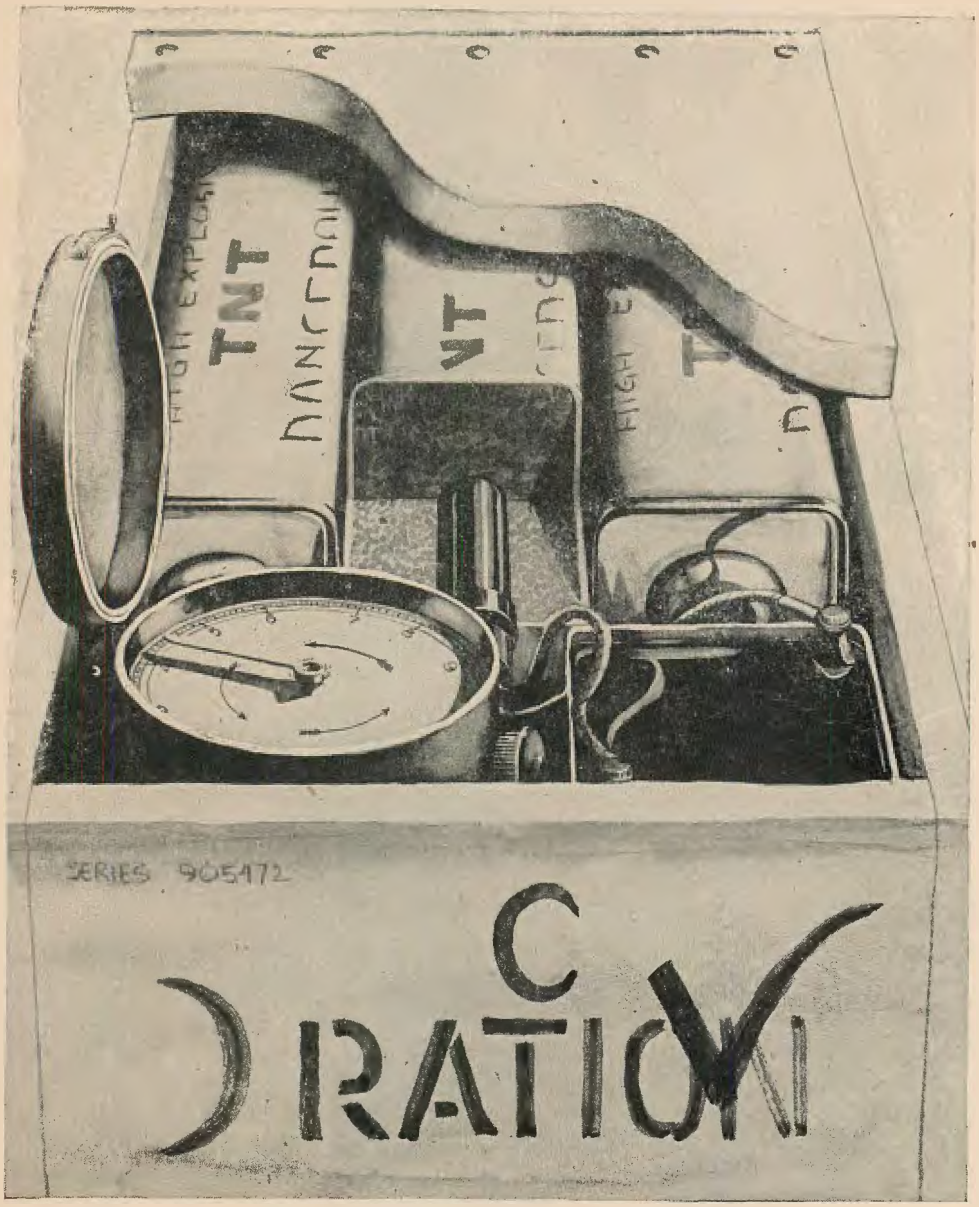

Figure 7. Clockwork delay mechanism.

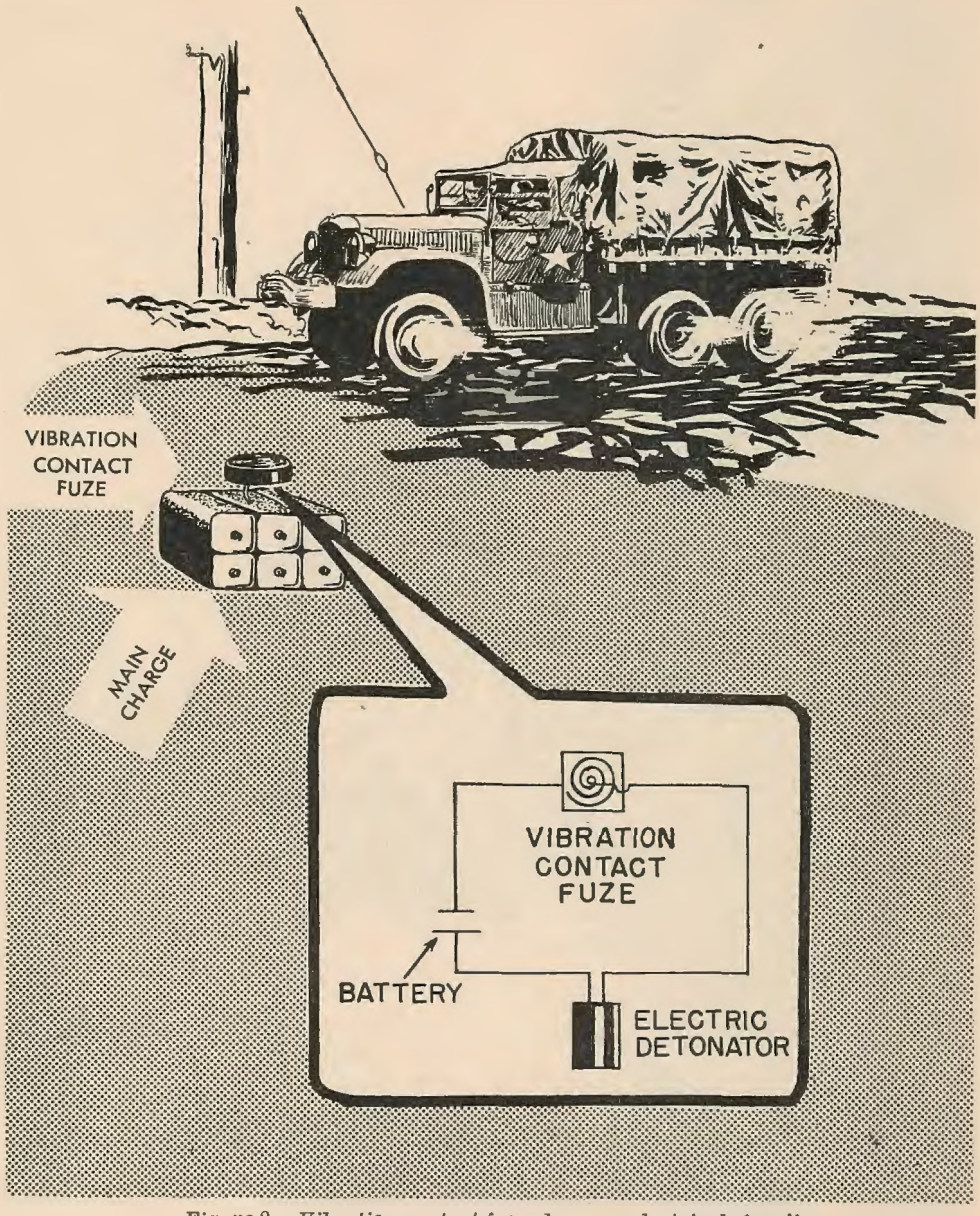

Figure 8. Vibration-contact fuze closes an electrical circuit.

Figure 9. Radio receives signal from transmitter and relays impulse to detonator.

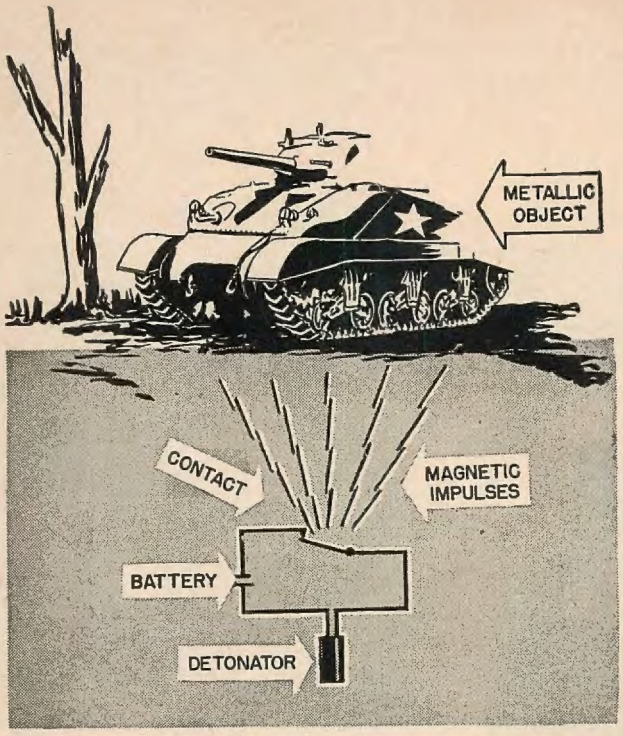

Figure 10. A metallic mass swings a magnetized lever to close a circuit.

a fuze (fig. 7). Sometimes this delayed-action mechanism consists of a vial containing a chemical which, upon being released, corrodes a striker-retaining pin or wire. Another way of obtaining a delayed action is to provide a chemical vial within the fuze. An application of any of the previously mentioned initiating actions will result in the chemical vial being broken. The desired time delay is the time required for the chemical to corrode the striker-retaining pin or wire.

(6) *Vibrations* induced by movement in water, air, ground, or structure, where a vibration-contact fuze is laid (fig. 8).

(7) *Frequency induction* by:

(*a*) Operating an electric mine detector over a pick-up coil of an induction fuze.

(*b*) Sending radio signals on the same frequency as that of the induction fuze (fig. 9).

(8) *Magnetic induction* by moving a metallic mass over a magnetic type fuze (fig. 10).

(9) *Breaking a light beam* or otherwise completing an electric circuit (fig. 11).

b. Fuze. The initiating action starts the fuze functioning. The fuze, in turn, ignites the detonator by one of the following means:

(1) *Mechanical.* A percussion cap within the fuze is fired by a mechanically released striker (fig. 6). The percussion cap in turn ignites a detonator. Ignition by friction, as shown in figure 6, is another mechanical method.

(2) *Chemical.* A small vial containing acid is broken. The chemical reaction of the acid with the explosive generates heat which sets off the explosion (fig. 6).

(3) *Electrical.* The closing of a circuit fires an electric detonator (figs. 6 and 12).

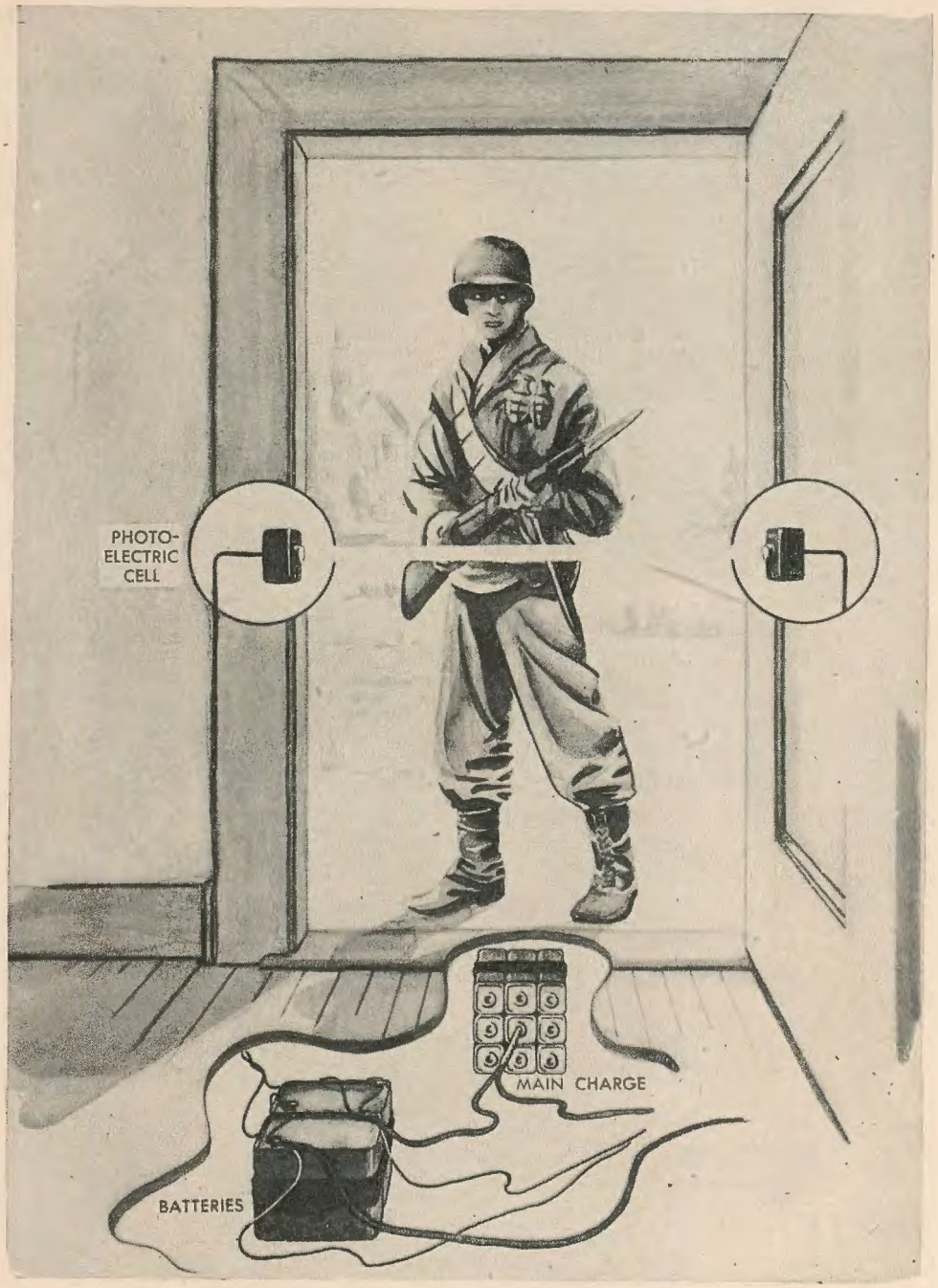

Figure 11. Electric circuit is completed when light beam is broken.

(4) *Chemical-electrical.* A chemical reaction causes an electric circuit to close.

(5) *Mechanical-chemical.* A chemical is used to corrode a pin holding a spring-loaded striker. When the pin is sufficiently corroded to break, it releases the spring-loaded striker.

c. Detonator. The detonator, a highly sensitive explosive, is set off by the flame or concussion of the fuze (fig. 5).

d. Booster Charge. The booster charge consists of a less sensitive but more powerful explosive than that in the detonator and produces an intermediate explosion (fig. 5). A booster charge is not necessary in some mines.

e. Main Charge. The main charge, a relatively insensitive explosive surrounding and detonated by the booster charge or detonator, provides the destructive power of the mine (fig. 5).

Figure 12. Ignition by electrical means.

Chapter 2

FOREIGN MINE WARFARE EQUIPMENT

5. Types of Mines

a. Antitank Mines. Antitank mines are designed primarily for immobilizing tanks. Although all of the major foreign armies have antitank mines, the amount of explosive in one mine is not sufficient in most cases to immobilize a tank. To accomplish the mission two or more mines are placed together.

b. Antivehicular Mines. Antivehicular mines are designed primarily for immobilizing tracked or wheeled vehicles other than tanks. However, two or more of these mines are often placed together to immobilize tanks. All of the major foreign armies employ antivehicular mines. They are referred to as antitransport mines in the Soviet Army.

c. Dual-Purpose Mines. Dual-purpose mines are designed both to immobilize vehicles and to produce casualties among personnel. Normally, these mines can be distinguished by the pressure-pull fuze used in them. The fuze is designed to be detonated by vehicles (pressure) and by personnel (pull). Many of the foreign armies use dual-purpose mines.

d. Antipersonnel Mines. Antipersonnel mines are used primarily to produce casualties to personnel. They may be placed to protect antitank mine fields and other obstacles, to give local security and warning, or as nuisance mines to harass and delay the enemy. Normally, they are not effective against armored vehicles but may inflict some damage on other vehicles. Antipersonnel mines found in foreign armies are of two general types: shrapnel mines which are designed to injure or kill more than one person, and concussion mines designed to kill or injure only the person who steps on or actuates the mine. Antilifting devices and booby traps are classified as antipersonnel mines, since they are primarily designed to inflict injuries upon personnel. All of the major foreign armies employ antipersonnel mines.

(1) *Antilifting devices.* An antilifting device is a mechanical or a combination mechanical and explosive device designed specifically to cause a mine to detonate when an attempt is made to lift or move the mine (fig. 13). Antilifting devices are primarily designed for an antipersonnel role. Certain types of fuzes, particularly pressure-release fuzes, are in effect antilifting devices as well as booby-trap mechanisms. Some armies, notably the German and Soviet, have produced antilifting devices for the specific purpose of placing them under antitank and antivehicular mines to prevent safe removal of the mines.

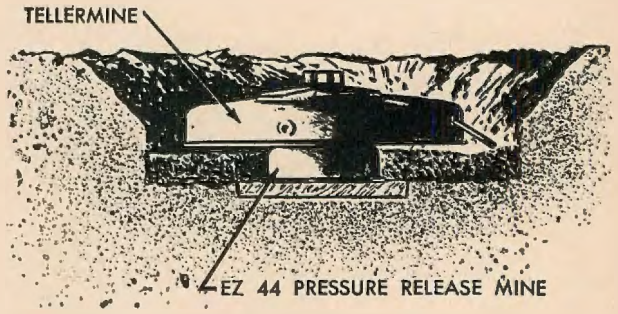

Figure 13. Antilifting device placed under a mine.

(2) *Booby traps.*

(*a*) A booby trap is a hidden mine or charge with its firing mechanism placed in such a way that an unsuspecting person disturbing an apparently harmless object causes the mine or charge to detonate (fig. 14).

(*b*) Booby traps are especially intended to inflict casualties on and to destroy the

morale of opposing forces. They are normally installed during a retrograde movement or during raids or patrols into the positions of the opposing forces. Booby traps may be encountered under any circumstances. They may be found attached to equipment, dead soldiers, and supplies. They may also be installed in abandoned buildings. Ingenuity of installation largely determines their effectiveness.

e. Railroad Mines. Railroad mines are designed specifically to wreck trains. In most instances, railroad mines incorporate a delay rather than an instantaneous type of fuze and are used as initiating mines to detonate large charges buried in railroad beds. Germany, Italy, and Russia employed railroad mines in World War II.

f. Beach Mines. Beach mines are primarily designed to destroy landing craft and amphibious vehicles, to hinder the landing of an opposing force, and to disable landed vehicles. They vary greatly in size, explosive content, and type of fuze used. The Japanese, in particular, employed beach type mines in World War II.

g. River Mines. River mines are used to destroy floating bridges, fixed bridge piers, and river shipping. They vary considerably in size and explosive content. The usual method of functioning is by the use of pressure or pull fuzes. Germany and Russia employed river mines in World War II.

h. Improvised Mines. Improvised mines are used when standard mines are unsuitable or unavailable for a particular mission. They are made by filling with an explosive any type of container, such as bottles, crates, sacks, barrels, and tin cans. Improvised mines may also be made of bombs, shells, or grenades fitted usually with a pressure or pull fuze. They are extremely dangerous to handle. The Soviet Army places much emphasis on improvised mines.

i. Dummy Mines. Dummy mines can be made of any material available. They may be installed in dummy mine fields or may be used to supplement real mines in a live mine field to delay and confuse the enemy by making it necessary for him to consume time in investigating and removing them.

j. Training Mines. Mines used in training contain no explosive charges but are similar in construction to standard mines. Various means are available for simulating detonation of the training mines. Training mines are called practice mines in United States mine warfare terminology.

k. Others. A number of other types of mines are found in some of the foreign armies, but the types listed above are common in most foreign armies and are employed in the greatest numbers.

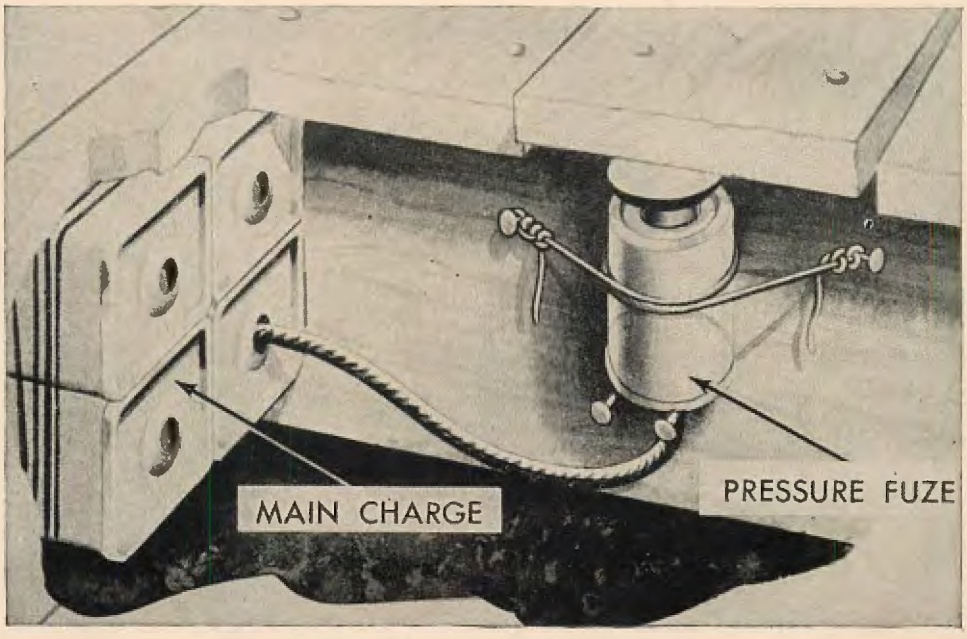

Figure 14. Booby-trap installation.

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6. Mine Laying, Marking, and Recording Equipment and Supplies

a. Mine Laying Devices. Most armies today rely upon manpower to fuze mines, to prepare holes for them in the ground, and to arm and conceal them. Mine spacing cords and special tools are used by many armies to aid in spacing mines within a mine field and in actually preparing holes for individual mines. Some countries are experimenting with mechanical mine laying devices. The Germans developed a mine laying vehicle in the early part of World War II, but the device proved impracticable.

b. Mine Marking Equipment. Mine marking equipment includes all items, such as special tags, flags, and tracing tape, used to mark mine fields and individual mines.

c. Mine Recording Supplies. This type of material usually includes special reports, forms, maps, and other pictorial aids used to record the location of mine fields and individual mines.

7. Mine Detecting Equipment

Mine detecting equipment includes all devices, such as probes and electronic mine detectors, designed specifically for locating mines. Some countries experimented with substituting trained dogs for equipment to detect mines, but such practices proved impracticable.

8. Mine Clearing Equipment

Mine clearing equipment includes vehicle-mounted devices, such as tank-mounted flails, rollers, and drags, and propelled explosive devices. Manually operated mine clearing devices include grapnels, rollers, and explosive charges.

Chapter 3

NEUTRALIZATION AND REMOVAL OPERATIONS

9. Hand Neutralization of Mines and Fuzes

Troops must know how to neutralize foreign mines and fuzes. Although normally a mine field contains only a few activated mines, during a clearing operation it must be assumed that all mines are activated. Furthermore, troops must be familiar with the types and location of safeties on mines and fuzes. They must also know how to cut the firing chain of a mine to render the mine harmless.

a. Safeties. Organic safeties are built into practically all mines and fuzes (fig. 15). They are designed to nullify the initiating action.

b. Cutting the Firing Chain. A mine is harmless if the firing chain is cut. This is done by cutting any link in the chain; that is, by separating any two of its elements (fig. 16).

c. Steps in Hand-Neutralizing. The steps in hand neutralizing a buried mine are as follows:

(1) Carefully probe to locate the mine exactly.
(2) Carefully search around and under the mine, locating and neutralizing all secondary fuzes.
(3) Neutralize the mine by making the main fuze safe. Some foreign mines contain fuzes that cannot be made safe in any way. These mines should be neutralized either by destroying them in place with a prepared charge or by carefully lifting and carrying them to a safe place, where they are destroyed.

10. Removal of Mines

a. The following general rules should be applied when removing foreign mines.

(1) Handle all mines and fuzes with care at all times.
(2) Use only one man to work on a mine.
(3) Carefully examine the ground around a mine before starting to work on it.
(4) Constantly be on the lookout for booby traps.
(5) Prior to lifting a mine, neutralize all fuzes and cut any *slack* trip wires.
(6) Never cut a taut wire; never pull a slack one. Look at *both* ends of a wire before you touch it.
(7) When detonation of a mine in place is objectionable pull the mine clear with 50 yards of rope or signal cable.
(8) Take cover before you pull a mine, and do not come out for at least 10 seconds after you have pulled it. There may be a delay fuze. Examine the covered position for booby traps before occupying it.
(9) Never use force on a mine or booby trap. If a part cannot be removed without applying an undue amount of force, discontinue further attempts to remove the part.
(10) If you must leave a mine or booby trap unlifted, mark the location prominently.
(11) Neutralize antipersonnel mines by replacing all safety pins before you lift them.
(12) Keep your eyes on the ground in front of you when walking in a mine infested area.
(13) When cutting the wires of an electrical detonator cut them one at a time.

b. Mines can be removed by pulling them out from defilade with a long rope (fig. 17) or signal wire. If no defilade is at hand, a safe pulling distance is at least 50 yards. With this method, always remain in a prone position. Activated mines are normally detonated in this manner.

c. Mines can be neutralized by destroying them in place with hand-placed charges. The charges

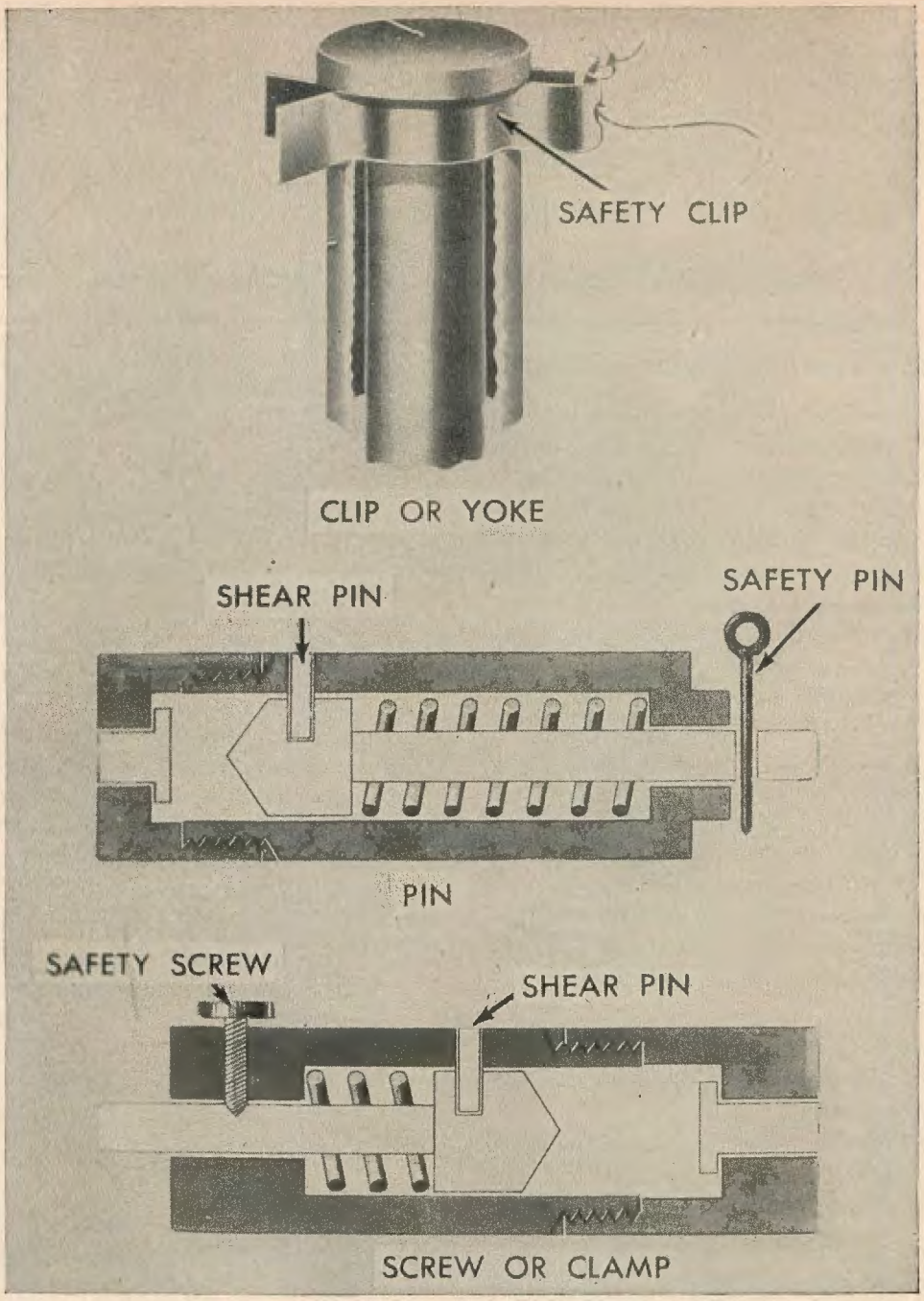

Figure 15. Types of safeties on different fuzes.

are placed on or beside the mines to be destroyed (fig. 18). The mines themselves are not handled.

d. Improvised grapnels can be used to actuate charges fastened to trip wires. The grapnel is thrown out over the field and then pulled back. As it comes back, it trips the wires or cords, setting off the charges.

e. Mechanical and blast methods have been developed to neutralize mines by exploding them. Such mechanical and explosive devices are the scorpion or flail, various pressure-roller devices, the various demolition snakes, bangalore torpedoes, and explosive mats or carpet rolls.

f. In World War II, both the Germans and the Soviets employed artillery to clear gaps through known mine fields. Some countries have experi-

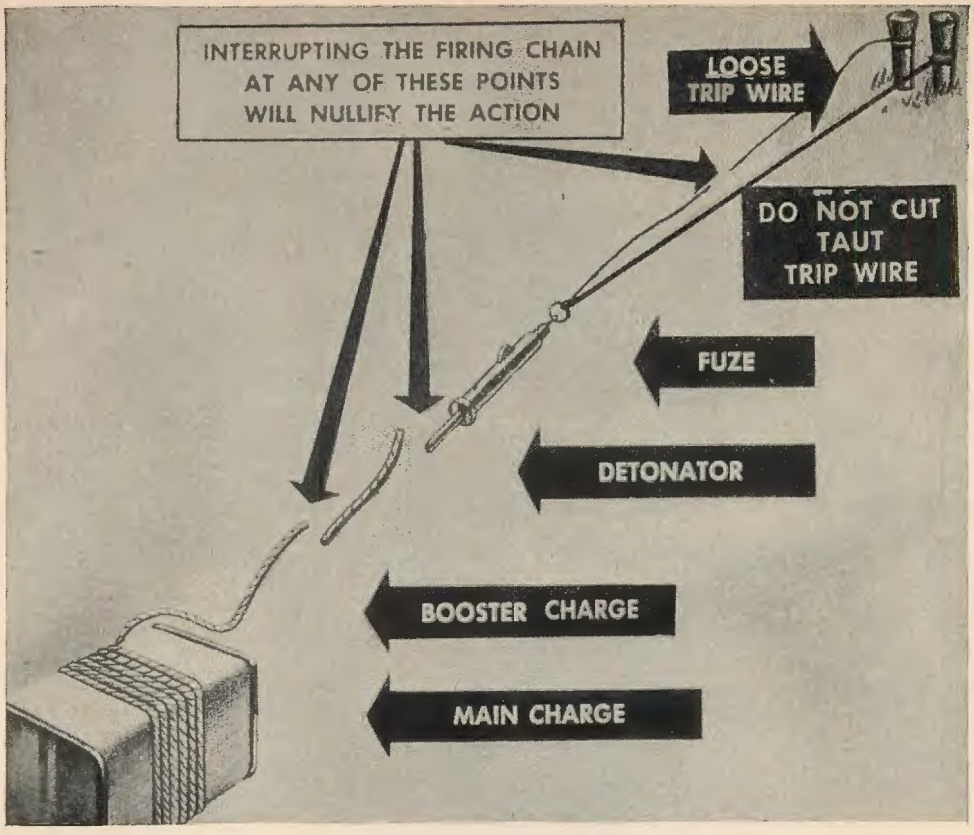

Figure 16. Interrupting the firing chain of a mine.

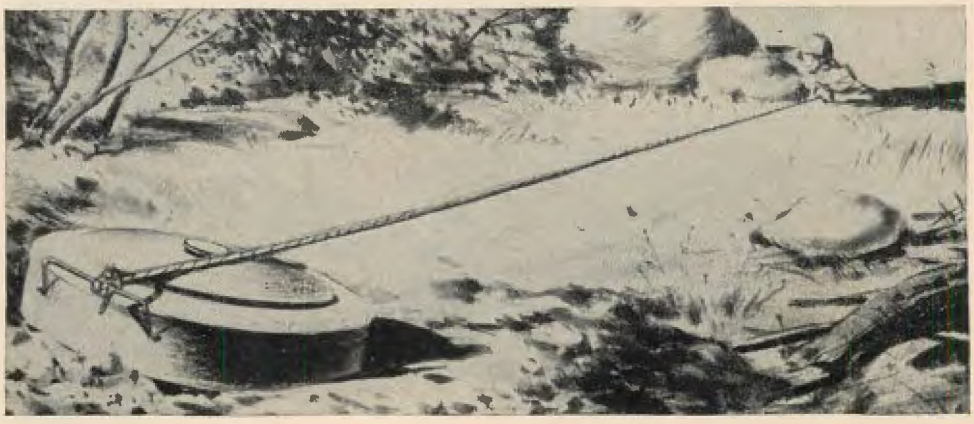

Figure 17. Removing a mine by rope from a safe distance of 50 yards.

mented with area bombing by aircraft to clear gaps through mine fields.

g. Wooden and cardboard mines that have been buried for long periods are dangerous to remove. Experience has shown that mines composed of wood or cardboard will deteriorate rapidly under humid or damp-soil conditions. If a wooden mine is subjected to alternate periods of dampness and dryness, the mine will undergo serious deformation resulting in large cracks which will permit the entrance of soil moisture into the explosive chamber. In some wooden and cardboard mines the explosive filler hole is sealed with tar. This tar will develop cracks after continuous exposure. Wooden pressure lids that contain grooves to assist detonation will rot in the grooves and will detonate readily when pressure is brought to bear on the pressure lid with a mine probe. Mine field clearing personnel must be cautioned in the use of the mine probe when the mines are known to

Figure 18. Placement of charge on mines to be destroyed in place.

be in an advanced state of deterioration. The mine probe should be held at the smallest practicable angle to the ground so as to come into contact with the side of the mine instead of the pressure lid. In many cases the only practicable method of mine removal will be the use of demolition charges. Care must be taken to see that all personnel are removed from the area before any demolition charges are detonated. Entire mine fields have been known to explode from sympathetic detonation. Mine fields composed of wooden and cardboard mines which are deteriorated are particularly susceptible to sympathetic detonation.

h. Metallic mines that have been buried for long periods of time are dangerous to remove. They will rust to such an extent that it becomes almost impossible to detect their location with the mine

detector. In general, mines of metallic construction which use waterproof seals will withstand the action of soil moisture better than wooden or cardboard mines. Eventually, however, the mine body will rust and the explosive will become contaminated.

i. Some types of fuzes become extremely sensitive when they are exposed to soil moisture. These types should be removed by placing demolition charges or using tank rollers and other devices which will permit the removal of the mines without undue exposure of personnel.

PART TWO

BRITISH MINE WARFARE EQUIPMENT

Chapter 4

INTRODUCTION

11. General

Since World War II, the United States and Great Britain have collaborated on the research and development of mines and mine warfare equipment so that such equipment may become standard for both countries. The British mine warfare equipment discussed in this manual is limited to that equipment considered standard in 1946, since information on subsequent equipment is classified higher than restricted security information.

12. Fuzes

The British Army had a wide variety of fuzes in World War II, including pressure, pull, pressure-release, electrical, and chemical fuzes. Six models of clockwork fuzes were produced by the British. They were not for general issue to troops but for special use in delayed detonation of large charges placed by commandos or by saboteurs. The British used the term *fuze* or *igniter* when referring to the device used to actuate the land mines, and the term *switch* when referring to the device used to actuate booby traps and time (safety) fuze. They are currently using the word *fuze* for all these devices, in accordance with United States and British policy of standardization of mine warfare terminology.

13. Mines

The British employed 15 models of antitank mines, 2 dual-purpose mines, and 7 models of antipersonnel mines in World War II. Not all of these mines remained standard and this manual discusses only those mines which are still in use by the British or, if considered obsolete by the British, are possibly in use by other armies. The British also had several models of mines fitted with magnets designed to be attached to vehicles, railroad rails, and other metallic objects. These were special mines or sabotage weapons and were not issued generally to troops. They were called *limpets* or *clam bombs* by the British.

14. Mine Detectors

The British used the mine prodder No. 4 as their standard mine probe. They produced 11 standard portable metallic-mine detectors.

Chapter 5

FUZES

Section I. PRESSURE FUZES

15. British Pressure Fuze, Antitank, No. 1, Mark I

a. Description. The British pressure fuze, antitank, No. 1, Mark I (fig. 19) is of the instantaneous, mechanical type and contains a spring-loaded striker with a ball release. It consists of a cylindrical brass case housing a pressure head, a plunger, a brass safety sleeve with four prongs that retain the plunger and the pressure head, a spring-loaded striker held in place by two striker-retaining balls, and a brass resistance collar surrounding the pressure head. A percussion cap and a detonator are built into the base of the fuze. A brass pressure cap covers the pressure head.

b. Employment. This fuze was designed specifically for use with the G. S. (general service) antitank mine, Mark II (par. 34).

c. Functioning.

(1) A pressure of 350 pounds crushes the brass pressure cap.

(2) The pressure head and the plunger are forced down, pushing aside the four prongs on the brass safety sleeve and compressing the striker spring.

(3) The striker-retaining balls are forced outward into a recess in the plunger, re-

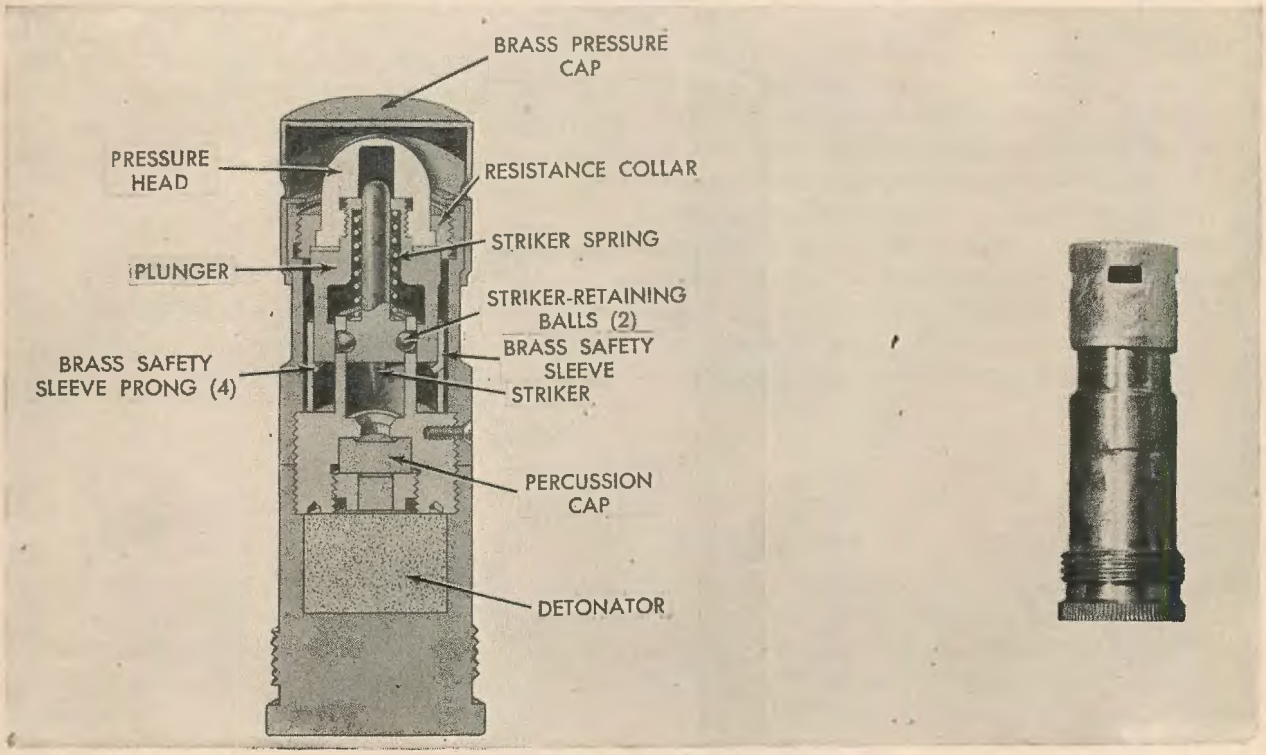

Figure 19. British pressure fuze, antitank, No. 1, Mark I.

leasing the spring-loaded striker against the percussion cap.

d. Installing and Arming. This fuze has no safety devices. Screw the fuze into fuze well of the G. S. antitank mine, Mark II.

e. Neutralizing. Although this fuze has no safety devices, the high pressure required to actuate it makes it fairly safe to handle. Unscrew the fuze from the mine.

f. Packing. Eight fuzes are packed in a sheet-metal case which is carried in a crate of eight G. S. antitank mines, Mark II.

16. British Pressure Fuze No. 2, Mark II

a. Description. The British pressure fuze No. 2, Mark II (fig. 20) is of the instantaneous, mechanical type and contains a spring-loaded striker with a shear-neck release. It consists of a cylindrical brass case screwed to a rectangular metal base plate, which is 3⅝ inches long and 1½ inches wide. A portion of the striker shaft is turned down to a smaller diameter to form a shear neck. A pointed actuating bar protrudes through an opening in the side of the fuze case and rests on the shear neck of the striker shaft. A pressure head is attached to the top of the actuating bar. A safety pin extending through the actuating bar just below the pressure head prevents any downward movement of the actuating bar. A striker-retaining pin extending through the end of the striker shaft holds the striker in place. A fuse adapter with a built-in percussion cap is attached to the open end of the fuze case by a threaded retaining collar. The over-all length of the fuze case and attached fuse adapter is 7 inches.

b. Employment. This fuze is used under boards, doormats, and similar places in booby-trap installations where detonation of a charge by direct pressure is desired.

c. Functioning. A pressure of from 30 to 40 pounds on the pressure head forces the actuating bar against the shear neck of the striker shaft, snapping the striker shaft and releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Remove the pressure-head-and-actuating-bar assembly from its carrying hole in the base plate, in which it is retained prior to use.

(2) Install the fuze in position.

(3) Insert the actuating bar in the opening in the side of the fuze case and position it so the point is resting on the shear neck of the striker shaft with the flat extension against the side of the shear neck; if the actuating bar is properly positioned, the pressure head cannot be rotated.

(4) Insert a length of time fuse or detonating cord into the fuse adapter.

(5) Remove the safety pin from the actuating bar.

e. Neutralizing. Insert the safety pin or a nail in the safety-pin hole and lift the pressure-head-and-actuating-bar assembly from the fuze case. If this is not possible, cut the time fuse or detonating cord that connects the fuze to the charge. Remove the time fuse or detonating cord from the fuse adapter.

f. Packing. These fuzes, assembled with percussion caps and fuse adapters, are wrapped in wax paper and are packed 10 to a flat sheet-metal case (fig. 21) which is sealed with adhesive tape. Twenty of these sheet-metal cases are packed in a wooden box, 25 inches long, 9 inches wide, and 6 inches high. The total weight of the packed wooden box is 106 pounds.

17. British Pressure Fuze, Antitank, No. 3, Mark I

a. Description. The British pressure fuze, antitank, No. 3, Mark I (fig. 22) is of the instantaneous, mechanical type and contains a spring-loaded striker with a shear-pin release. The striker is held in place by a shear pin that is inserted through the striker shaft so as to bear against the top of the case. A cotter-pin type safety pin is inserted through the striker shaft just above the shear pin. The top of the cylindrical steel case is larger in diameter than the base. Crimped onto the base of the fuze is a cup that holds a detonator and a booster charge.

b. Employment. This fuze is used in the G. S. antitank mine, Mark V (par. 35), the G. S. antitank mine, Mark V HC (par. 36), the G. S. antitank mine, Mark Vc (par. 37), and the G. S. antitank mine, Mark IV (par. 39).

c. Functioning. A pressure of from 400 to 500 pounds on the end of the striker shaft shears the shear pin, releasing the spring-loaded striker against the percussion cap and firing the detonator and the booster charge.

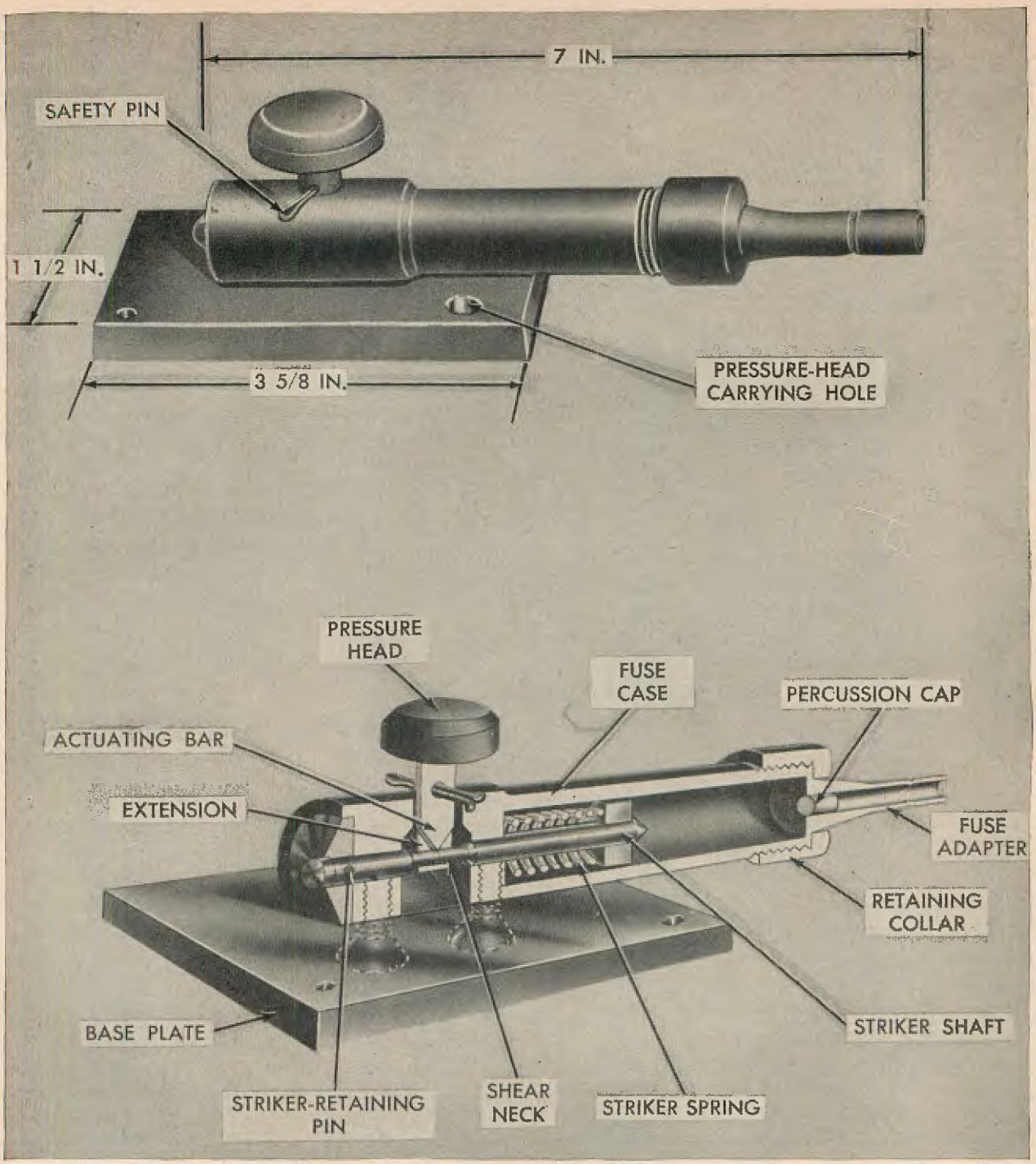

Figure 20. British pressure fuze No. 2, Mark II.

d. Installing and Arming. Place the fuze in the mine and withdraw the safety pin.

e. Neutralizing. Insert a safety pin or a nail in the safety-pin hole. Because of the high pressure necessary to shear the shear pin, the fuze would be safe to handle if it were not for the built-in detonator and booster charge. Because of the detonator and the booster charge, extreme care should be taken while handling the fuze, even when the safety pin is in place.

f. Packing. Twenty fuzes are packed in a wooden box.

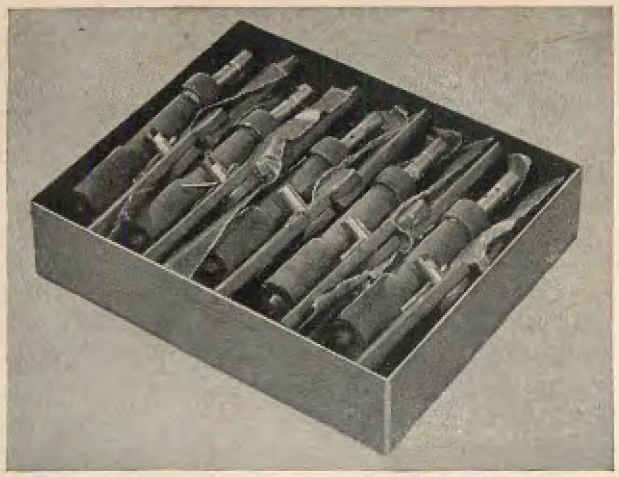

Figure 21. British pressure fuzes No. 2, Mark II, packed in a sheet-metal case.

18. British Pressure Fuze No. 5, Mark I

a. Description. The British pressure fuze No. 5, Mark I (fig. 23) is of the instantaneous, mechanical type and contains a spring-loaded striker with a trip-lever release. The sheet-metal fuze case contains the spring-loaded striker and the trip-lever mechanism. The free end of the trip lever is supported by two coil springs, which hold the bottom of the trip lever in a notch in the underside of the striker shaft. The hinged pressure lid rests on the projection of the trip lever. A brass sleeve can be screwed into the center of the pressure lid to take an adjustable extension pressure rod, 6 inches long. A fuze adapter with a built-in percussion cap is screwed into one end of the fuze case. A safety pin extends through the fuze case and the striker shaft. The fuze, without the brass sleeve, is 3¾ inches long, 1¼ inches wide, and ¾-inch high.

b. Employment. This fuze is employed with improvised mines and booby traps. The adjustable extension pressure rod provides a means for using this fuze under railroad tracks.

c. Functioning. A pressure of from 20 pounds applied at the free end of the pressure lid to 60 pounds applied at the center depresses the trip lever until it clears the notch in the striker shaft, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) *Without the extension pressure rod.*

(*a*) Install the fuze in position.

(*b*) Insert a length of time fuse or detonating cord into the fuse adapter.

(*c*) Withdraw the safety pin.

(2) *With the extension pressure rod.*

(*a*) Screw the brass sleeve tightly into the pressure lid, and screw the extension pressure rod all the way into the brass sleeve.

(*b*) Install the fuze in position.

(*c*) Unscrew the extension pressure rod until contact is made with the rail or object to be mined.

(*d*) Insert a length of time fuse or detonating cord in the fuse adapter.

(*e*) Withdraw the safety pin.

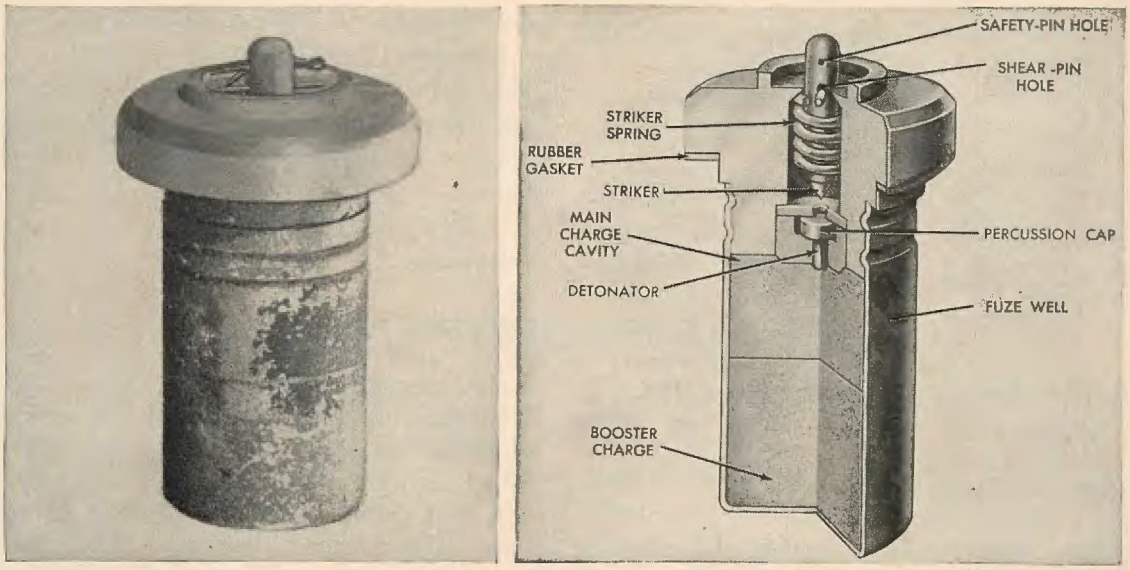

Figure 22. British pressure fuze, antitank, No. 3, Mark I.

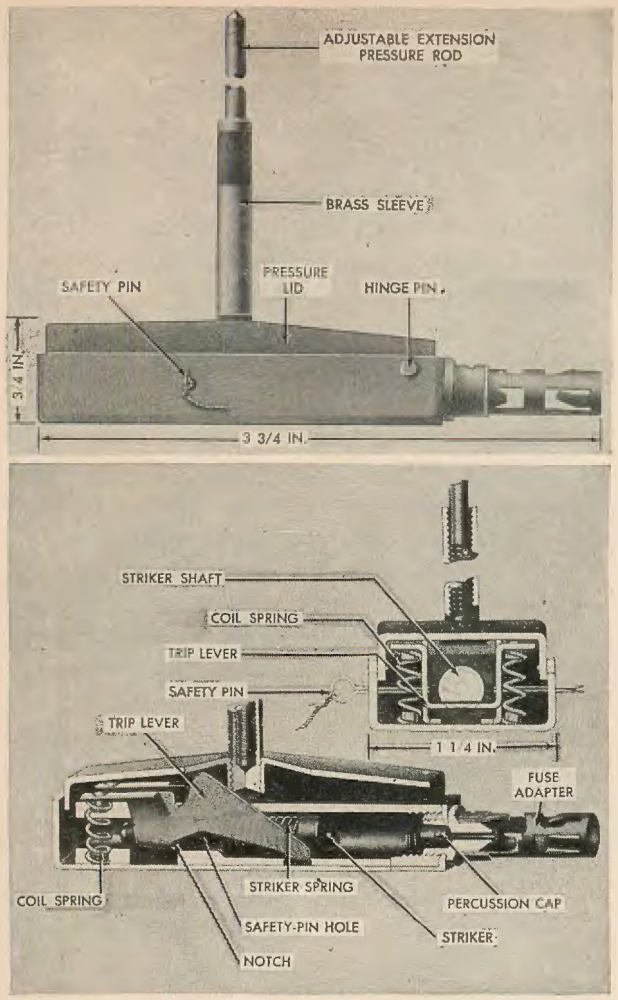

Figure 23. British pressure fuze No. 5, Mark I.

e. Neutralizing.

(1) Insert the safety pin or a nail in the safety-pin hole, through the striker shaft, and out of the other side of the case.

(2) Cut or remove the time fuse or detonating cord that connects the fuze to the charge.

f. Packing. Two fuzes, complete with fuse adapters, brass sleeves, and extension pressure rods, are packed in a cardboard carton. Five cartons are packed in a sheet-metal case, and 20 cases are packed in a wooden box, 24½ inches long, 13 inches wide, and 9½ inches high. The total weight of the packed wooden box is 94 pounds.

19. British Pressure Fuze No. 89

a. Description. The British pressure fuse No. 89 (fig. 24) is of the instantaneous, mechanical type and contains a spring-loaded striker with a ball release. It consists of a cylindrical ebonite case, ⅜ inch in diameter and 1¾ inches high, open at one end. The case houses a metal, spring-loaded striker held in place by two striker-retaining balls which, in turn, are held in place by a movable collar that is pressed onto the case. The percussion-cap-and-detonator assembly is a separate unit.

b. Employment. This fuze is used primarily with the antipersonnel mine No. 5, Mark I (par. 42).

c. Functioning. A pressure of from 6 to 12 pounds on the closed end of the ebonite case forces the case down through the collar until the striker-retaining balls clear the collar, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming. This fuze has no safety devices. After inserting the separate percussion-cap-and-detonator assembly in the fuze well of the mine, insert the fuze so the collar rests on top of the mine.

e. Neutralizing. Carefully lift the fuze from the mine and remove the percussion-cap-and-detonator assembly from the fuze well.

Caution: Do not exert any pressure on the movable collar that will cause it to move on the ebonite fuze case. The collar has to move only a fraction of an inch to free the striker-retaining balls.

f. Packing. Thirty fuzes are packed in a sheet-metal case.

Section II. PRESSURE-RELEASE FUZES

20. British Pressure-Release Fuze No. 3, Mark I

a. Description. The British pressure-release fuze No. 3, Mark I (fig. 25) is of the instantaneous, mechanical type with a leaf-spring-actuated striker. It consists of a rectangular steel case, 3 inches long, 2 inches wide, and ½ inch high, with a hinged lid. The case contains a hammer and a striker attached to the end of a leaf spring, which is held in the cocked position by a safety pin that extends through one side of the fuze case. When armed, the striker is retained by an inclined tongue in the hinged lid that acts as a

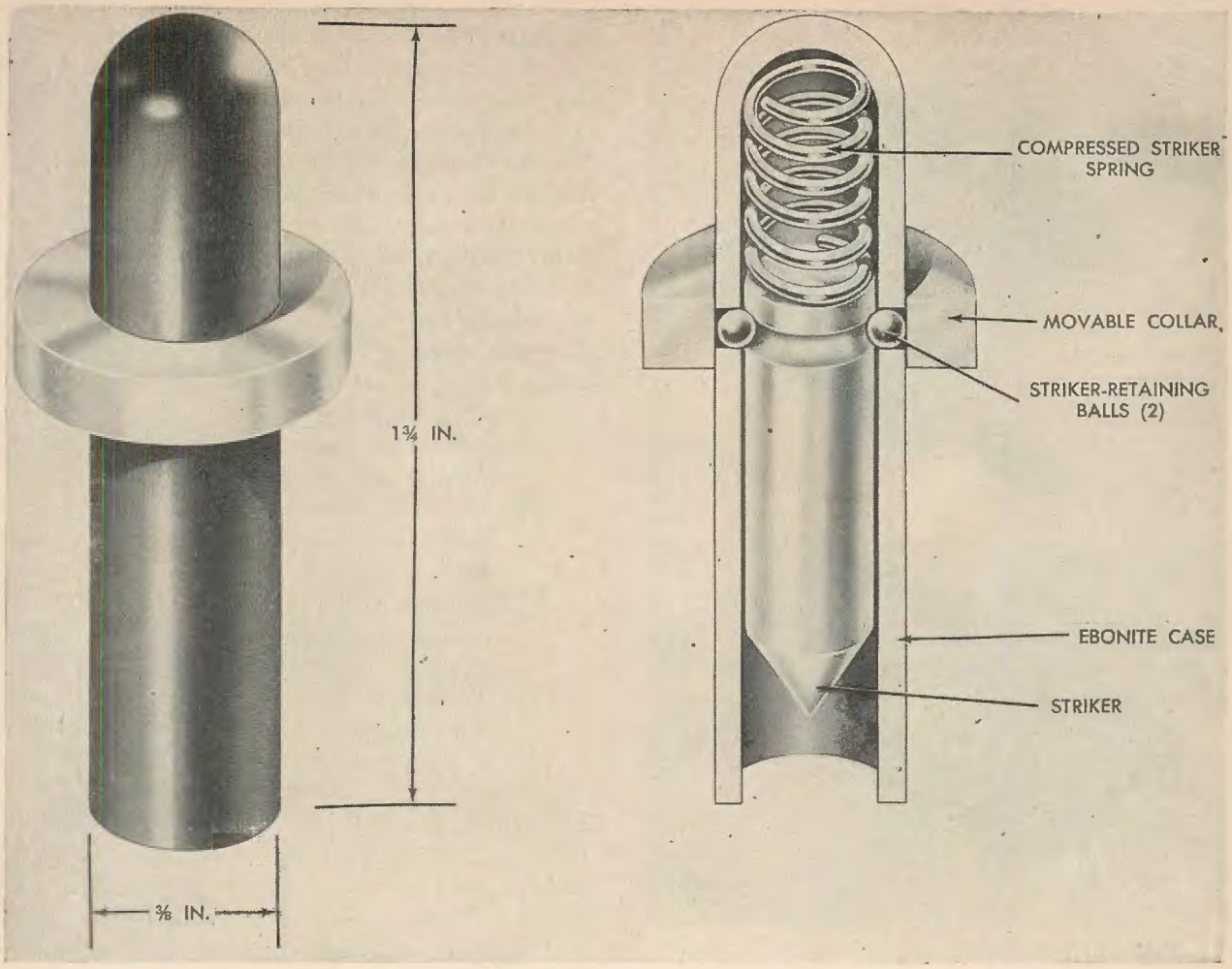

Figure 24. British pressure fuze No. 89.

stop for the leaf spring. A fuse adapter or detonator adapter with a built-in percussion cap is screwed into the side of the fuze.

b. Employment. This fuze is used with charges placed under crates, packages, and similar objects in booby-trap installations.

c. Functioning. When a weight is removed from the hinged lid, the pressure of the leaf spring on the inclined tongue forces the lid upward, releasing the leaf-spring-actuated striker against the percussion cap. The hammer adds momentum to the striker.

d. Installing and Arming.

(1) Bend the leaf spring back until the hole in the hammer is in line with the hole in the fuze case and insert the safety pin.
(2) Screw the fuse adapter or detonator adapter into the side of the fuze.
(3) Close the hinged lid and place the object to be booby-trapped on the lid so the lid is held down tightly.
(4) Insert a length of time fuse or detonating cord into the fuse adapter or insert a detonator in the detonator adapter.
(5) Withdraw the safety pin. With sufficient weight on the lid, the safety pin will be loose enough to be pulled out easily.

e. Neutralizing. Insert the safety pin or a nail in the safety-pin hole and remove the time fuse or detonating cord from the fuse adapter. If this is not possible, cut the time fuse or detonating cord that connects the fuze to the charge. If time fuse or detonating cord has not been used and the safety-pin hole is inaccessible, the fuze and charge must be destroyed in place.

f. Packing. These fuzes, with percussion caps and adapters, are wrapped in wax paper and are

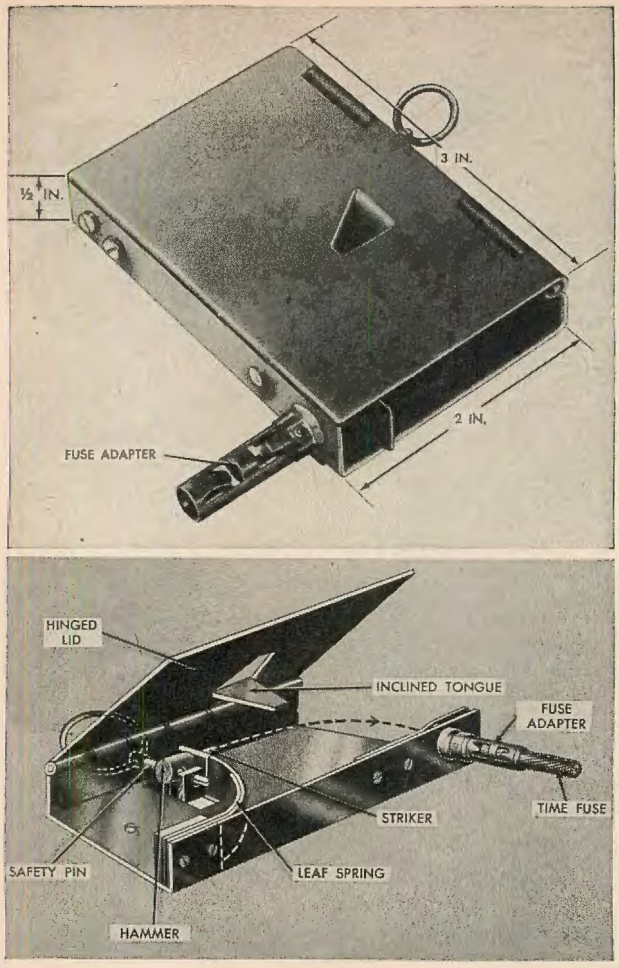

Figure 25. British pressure-release fuze No. 3, Mark I.

packed 10 to a flat sheet-metal case which is sealed with adhesive tape. Twenty of these sheet-metal cases are packed in a wooden box, 26 inches long, 9½ inches wide, and 8½ inches high. The total weight of the packed wooden box is 81 pounds.

21. British Pressure-Release Fuze No. 6, Mark I

a. Description. The British pressure-release fuze No. 6, Mark I (fig. 26) is of the instantaneous, mechanical type and contains spring-loaded striker with a trip-lever release. It consists of a rectangular metal case, 4½ inches long with a fuse adapter, ⅝ inch wide, and ⅝ inch high, with a hinged lid that rests on a hinged trip lever, which retains the spring-loaded striker by engaging in a notch in the top of the striker shaft. A cotter type safety pin extends through the fuze case and the striker shaft. A fuse adapter or detonator adapter with a built-in percussion cap is screwed into the end of the fuze.

b. Employment. This fuze is employed in booby-trap installations which are placed in narrow openings, such as under a door or behind a drawer. The fuze can be used under heavy weights, such as packing cases.

c. Functioning. When a weight is removed from the hinged lid, the pressure of the compressed striker spring pivots the trip lever about its hinge pin, lifting the hinged lid, until the trip lever clears the notch in the striker shaft, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Screw the fuse adapter or detonator adapter into the end of the fuze.

(2) Place the fuze under the object to be booby-trapped so the hinged lid is held down tightly.

(3) Insert a length of time fuse or detonating cord in the fuse adapter or insert a detonator in the detonator adapter.

(4) Withdraw the safety pin. With sufficient weight on the lid, the safety pin will be loose enough to be pulled out easily.

e. Neutralizing. Insert the safety pin or a nail in the safety-pin hole and remove the time fuse or detonating cord from the fuse adapter. If a detonator is employed remove it from the detonator holder. If this is not possible, cut the time fuse or detonating cord that connects the fuze to the charge. If time fuse or detonating cord has not been used and the safety-pin hole is inaccessible, the fuze and charge must be destroyed in place.

f. Packing. Two fuzes, with percussion caps and adapters, are packed in a cardboard carton. Five cartons are packed in a sheet-metal case, and 20 cases are packed in a wooden box, 22 inches long, 10½ inches wide, and 6 inches high. The total weight of the packed wooden box is 60 pounds.

22. British Pressure-Release Fuze No. 12, Mark I

a. Description. The British pressure-release fuze No. 12, Mark I (fig. 27) is of the instantaneous, mechanical type and contains a spring-loaded striker with a split-end release. It consists of a cylindrical metal case, pointed at the bottom, with a mushroom-shaped sheet-metal explosive container, holding 4 ounces of explosive, at the top.

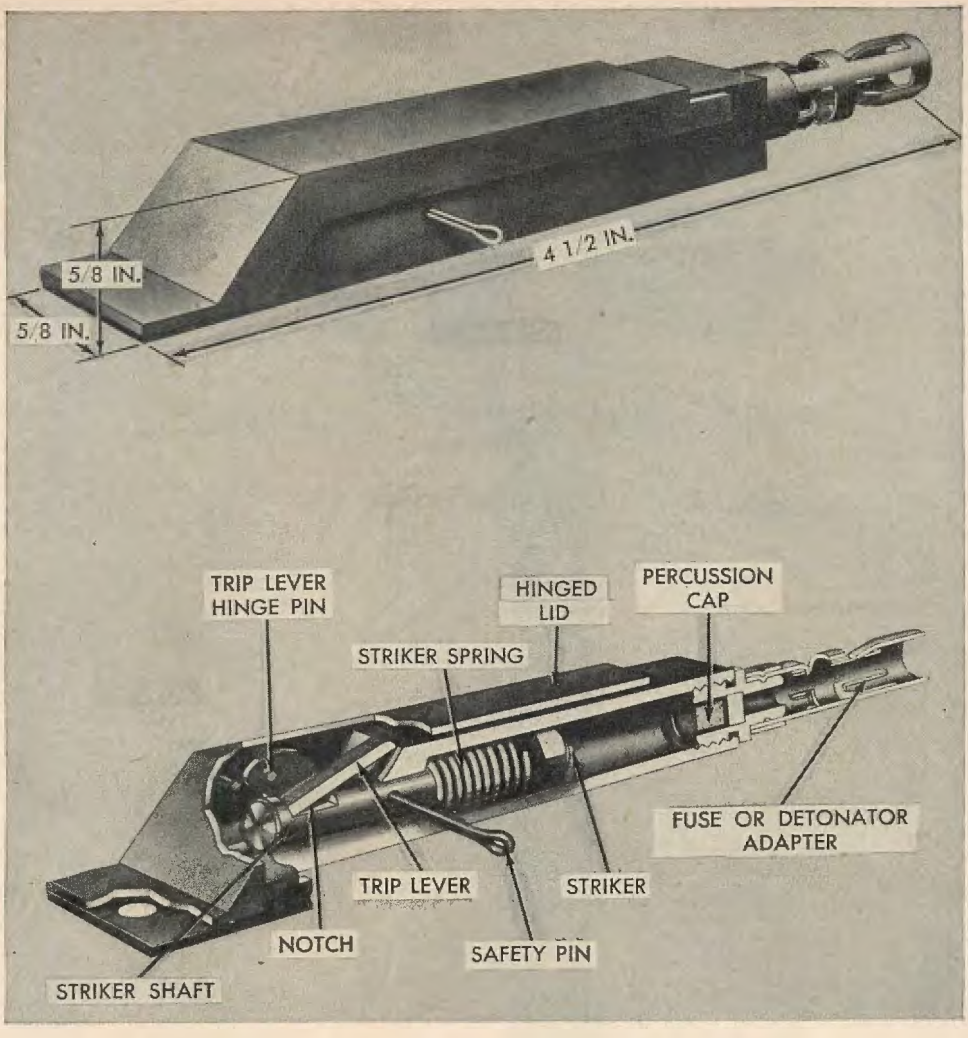

Figure 26. British pressure-release fuze No. 6, Mark I.

The case contains a spring-loaded striker having a shaft with a split end that fits over a retaining rod, which is permanently fixed to the bottom of the case. An actuating sleeve, which serves as a guide for the striker, clamps the split end of the striker shaft to the retaining rod. A lift spring surrounds the retaining rod and bears against the bottom of the actuating sleeve. A percussion-cap-and-detonator assembly is located in the upper part of the case. A safety pin is inserted through the case just below the explosive container, and is held in place by a cotter pin. During shipment, the percussion-cap-and-detonator assembly is removed and a wooden shipping plug is inserted in its place. A piece of adhesive tape secures the plug to the explosive container.

b. Employment. This fuze is used as an anti-lifting device under mines or any objects weighing more than 2.5 pounds.

c. Functioning. When a weight is removed from the top of the fuze, the explosive container and the actuating sleeve move upward under the action of the compressed lift spring until the striker shaft is freed from the retaining rod, releasing the spring-loaded striker against the percussion cap and firing the detonator and the explosive in the mushroom-shaped explosive container.

d. Installing and Arming.

(1) Push the pointed end of the fuze case into the ground until the bottom of the mushroom-shaped explosive container is flush with the ground surface.

(2) Remove the wooden shipping plug and insert the percussion-cap-and-detonator assembly.

(3) Lay a mine or other object on top of the fuze.

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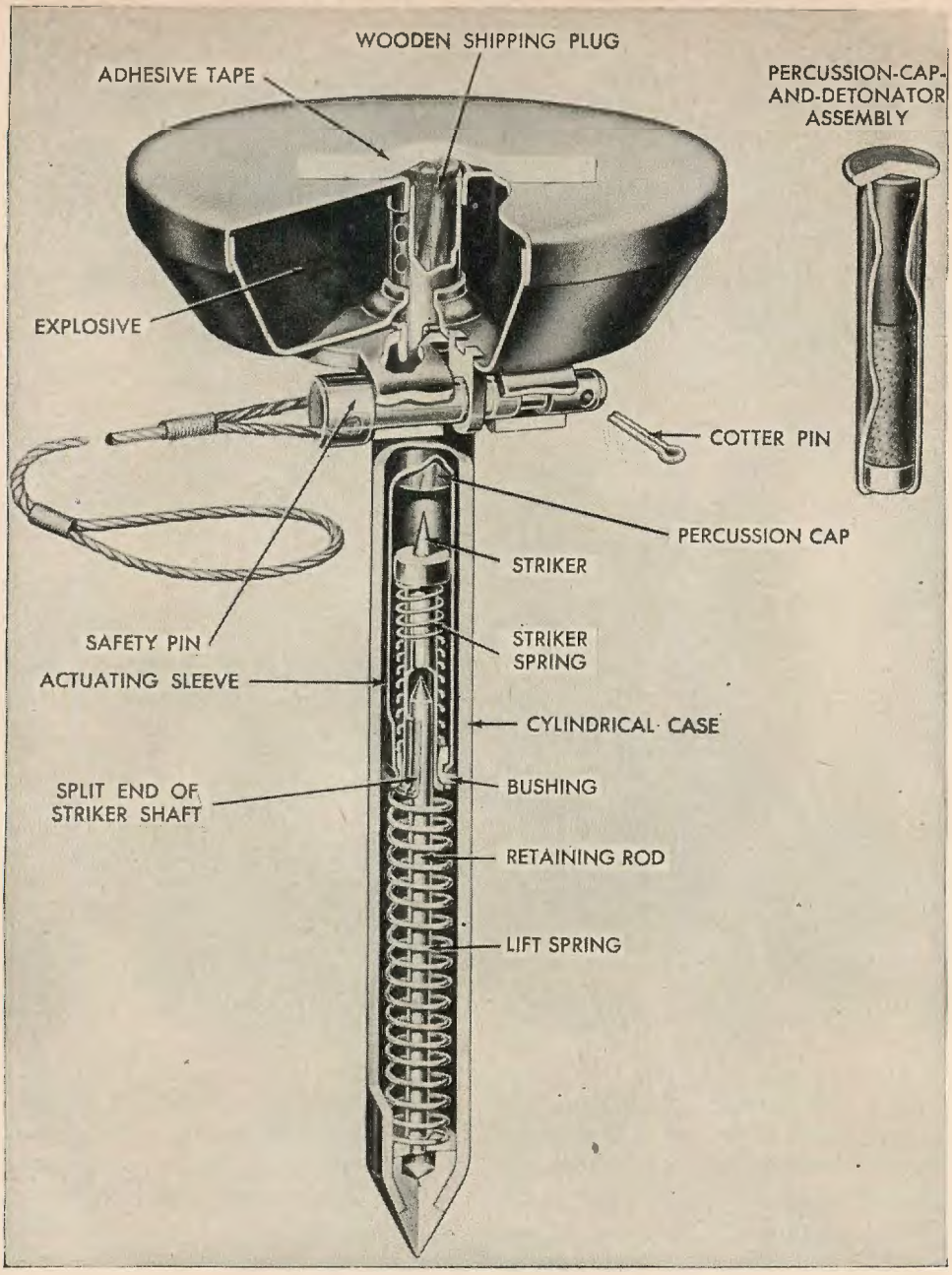


Figure 27. British pressure-release fuze No. 12, Mark I.

(4) Remove the cotter pin from the end of the safety pin and withdraw the safety pin by means of the cord attached to it.

Note.—If the weight of the object on top of the fuze is less than 2.5 pounds, the explosive container and the actuating sleeve will rise slightly, making it impossible to withdraw the safety pin.

e. Neutralizing. Normally, this fuze is not neutralized. However, if neutralizing is absolutely necessary, proceed, *with caution*, as follows:

(1) Make sure that the explosive container is held down securely by the object resting on it; then replace the safety pin.

(2) Remove the weight and lift the fuze out of the ground.

(3) Tip the fuze so the percussion-cap-and-detonator assembly will slide out.

f. Packing. Two fuzes are packed in a cardboard carton. Eight cartons are packed in a sheet-metal case, 12 inches long, 9 inches wide, and

5 inches high, which also contains 16 percussion-cap-and-detonator assemblies in a metal container. The total weight of the packed sheet-metal case is 24 pounds.

Section III. PULL FUZES

23. British Pull Fuze No. 1, Mark I

a. Description. The British pull fuze No. 1, Mark I (fig. 28) is of the instantaneous, mechanical type and contains a spring-loaded striker with a split-end release. It consists of a cylindrical steel case, 5/8 inch in diameter and 4 inches long, containing a spring-loaded striker having a shaft with a split end that fits over a retaining rod, which expands the split end of the striker shaft so it cannot pass through the hole in the retaining plug. The retaining rod is held in place by the retaining-rod spring. The retaining rod projects through the top of the fuze case, and a pull ring is attached to the end of the rod. A safety pin extends through the top of the fuze case and the retaining rod. A fuse adapter or detonator adapter with a built-in percussion cap is attached to the base of the fuze case by a threaded retaining collar. An anchor bracket is provided for mounting the fuze.

b. Employment. This fuze is used primarily with trip wires to actuate booby traps. It is also used to detonate mines and charges and to light flares.

c. Functioning. A pull of about 2 pounds on the pull ring pulls the retaining rod outward against the resistance of the retaining-rod spring, allowing the split end of the striker shaft to contract to where it can pass through the hole in the retaining plug, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Remove the fuse adapter or detonator adapter by unscrewing the retaining collar.
(2) If the anchor bracket is to be used, fasten it to an object and fit the fuze into the hole in the bracket.
(3) Insert a length of time fuse or detonating cord in the fuse adapter or insert a detonator in the detonator adapter.
(4) Attach the fuse adapter or detonator adapter to the base of the fuze by means of the retaining collar.
(5) Tie an anchored trip wire to the pull ring.
(6) Withdraw the safety pin gently; it should be loose in its hole.

e. Neutralizing.

(1) Insert the safety pin or a nail in the safety-pin hole.
(2) Cut the trip wire.
(3) Remove the fuse adapter or detonator adapter by unscrewing the retaining collar.

f. Packing. Ten fuzes are wrapped, completely assembled, in wax paper and packed, with 10 anchor brackets, in a sheet-metal case sealed with adhesive tape (fig. 29). An instruction pamphlet is also included. Twenty of these cases are packed in a wooden box weighing 52 pounds, when packed.

24. British Pull Fuze Mark III

a. Description. The British pull fuze Mark III (fig. 30) is of the instantaneous, mechanical type and contains a spring-loaded striker with a pin release. It consists of a cylindrical brass case, 3/4 inch in diameter and 3 inches long, containing a spring-loaded striker that is held in place by a cotter type striker-retaining pin inserted through the top of the striker shaft just above the top of the fuze case. A fuse adapter or detonator adapter with a built-in percussion cap is attached to the base of the fuze by a threaded brass retaining collar.

b. Employment. This fuze is employed as a fuse lighter in firing demolition charges. It is also used to detonate booby traps and improvised mines.

c. Functioning. Pulling out the striker-retaining pin releases the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Attach the fuze to an object.
(2) Insert a length of time fuse or detonating cord in the fuse adapter or insert a detonator in the detonator adapter.
(3) Tie an anchored trip wire to the eye in the striker-retaining pin.

e. Neutralizing.

(1) Cut the trip wire.

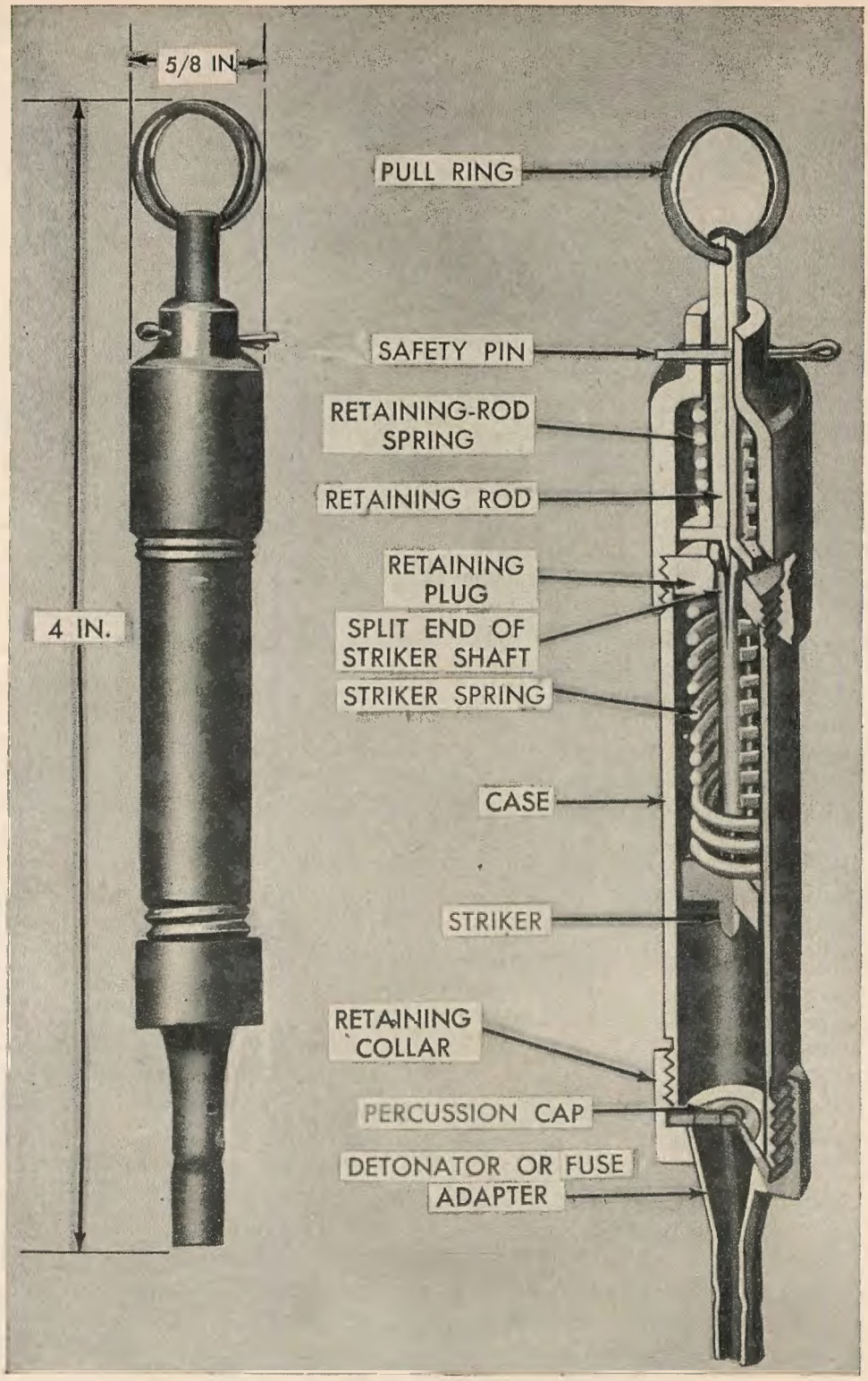


Figure 28. British pull fuze No. 1, Mark I.

Figure 29. British pull fuzes No. 1, Mark I packed in a sheet-metal case.

(2) Remove the fuse adapter or detonator adapter by unscrewing the retaining collar from the fuze case.

Caution: If the striker-retaining pin does not extend all the way through the striker shaft, the fuze should be destroyed in place.

f. Packing. Ten fuzes are packed in a sheet-metal case (fig. 31). Seventeen sheet-metal cases are packed in a wooden box, 19 inches long, 11 inches wide, and 7 inches high. The total weight of the packed wooden box is 31 pounds.

25. British Pull Fuze No. 4, Mark I

a. Description. The British pull fuze No. 4, Mark I (fig. 32) is of the instantaneous, mechanical type and contains a spring-loaded striker with a retaining-clip release. It consists of a cylindrical brass case, 7/16 inch in diameter and 3¾ inches long, containing a spring-loaded striker held in place by a U-shaped, claw-ended retaining clip with the claws gripping the ball-shaped end of the striker shaft. A safety pin extends through the top of the fuze case and the ball-shaped end of the striker shaft. Two mounting holes for attaching the fuze to an object are welded to the case. A fuze adapter or detonator adapter with a built-in percussion cap is screwed into the base of the fuze.

b. Employment. This fuze is used primarily with trip wires to actuate booby traps. It is also used to detonate mines and charges and to light flares.

c. Functioning. A pull of about 7 pounds on the U-shaped retaining clip pulls it off the ball-shaped end of the striker shaft, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Unscrew the fuse adapter or detonator adapter from the base of the fuze.

(2) Fasten the fuze to the object to be booby-trapped.

(3) Tie an anchored trip wire to the U-shaped retaining clip and adjust the tension of the trip wire until the safety pin lies about halfway along the slots in the fuze case.

(4) Insert a length of time fuse or detonating cord in the fuse adapter or insert a detonator in the detonator adapter.

(5) Screw the fuse adapter or detonator adapter into the base of the fuze.

(6) Withdraw the safety pin. Too much tension on the trip wire will jam the safety pin against the ends of the slots in the fuze case and prevent easy withdrawal.

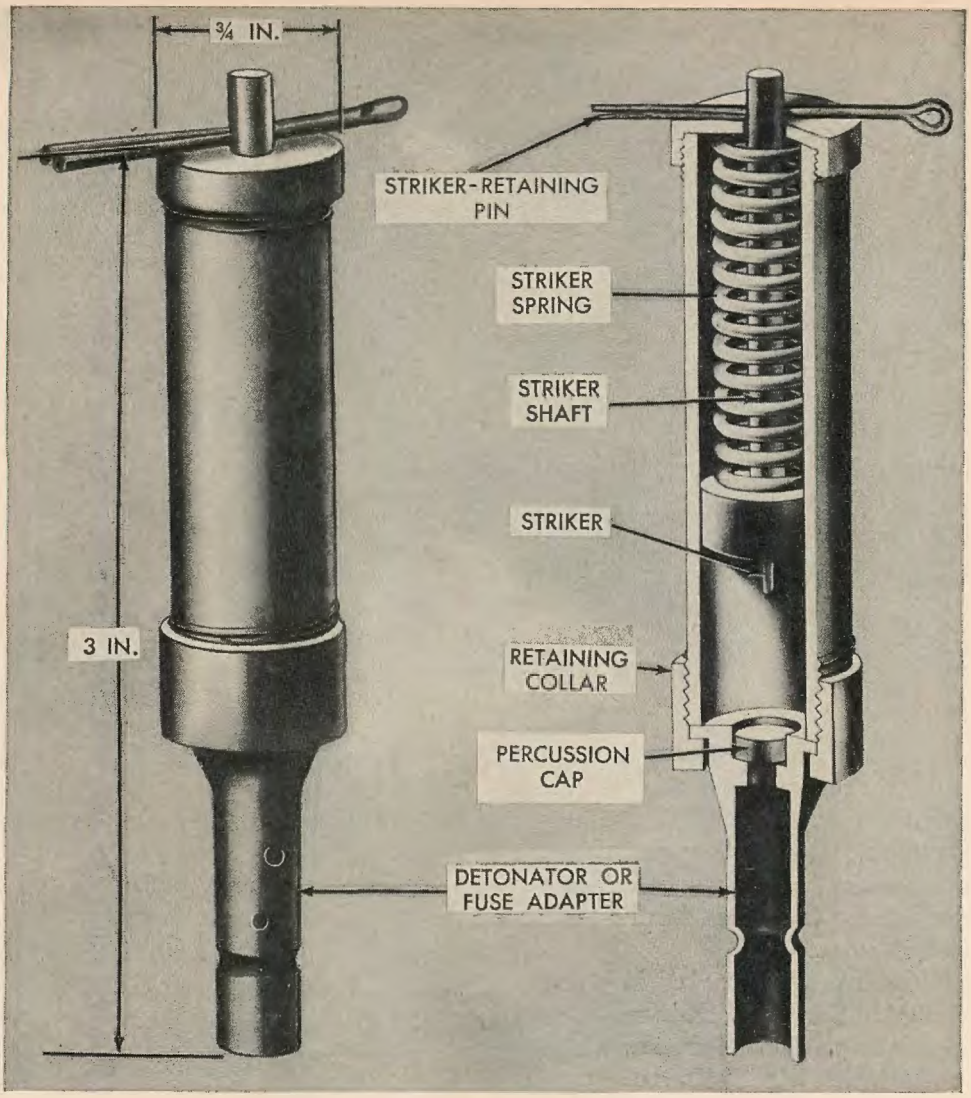


Figure 30. British pull fuze Mark III.

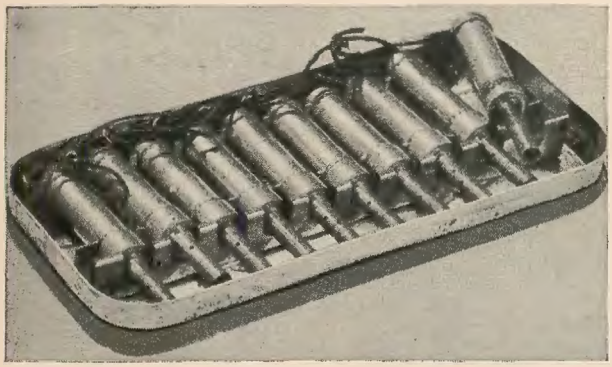


Figure 31. British pull fuzes Mark III packed in a sheet-metal case.

e. Neutralizing.

(1) Insert the safety pin or a nail in the safety-pin hole in the ball-shaped end of the striker shaft.

(2) Cut the trip wires.

(3) Unscrew the fuse adapter or detonator adapter from the base of the fuze.

f. Packing. Two fuzes are packed in a cardboard carton. Five cartons are packed in a sheet-metal case, and 20 cases are packed in a wooden box, 20 inches long, 9½ inches wide, and 6 inches high. The total weight of the packed wooden box is 35 pounds.

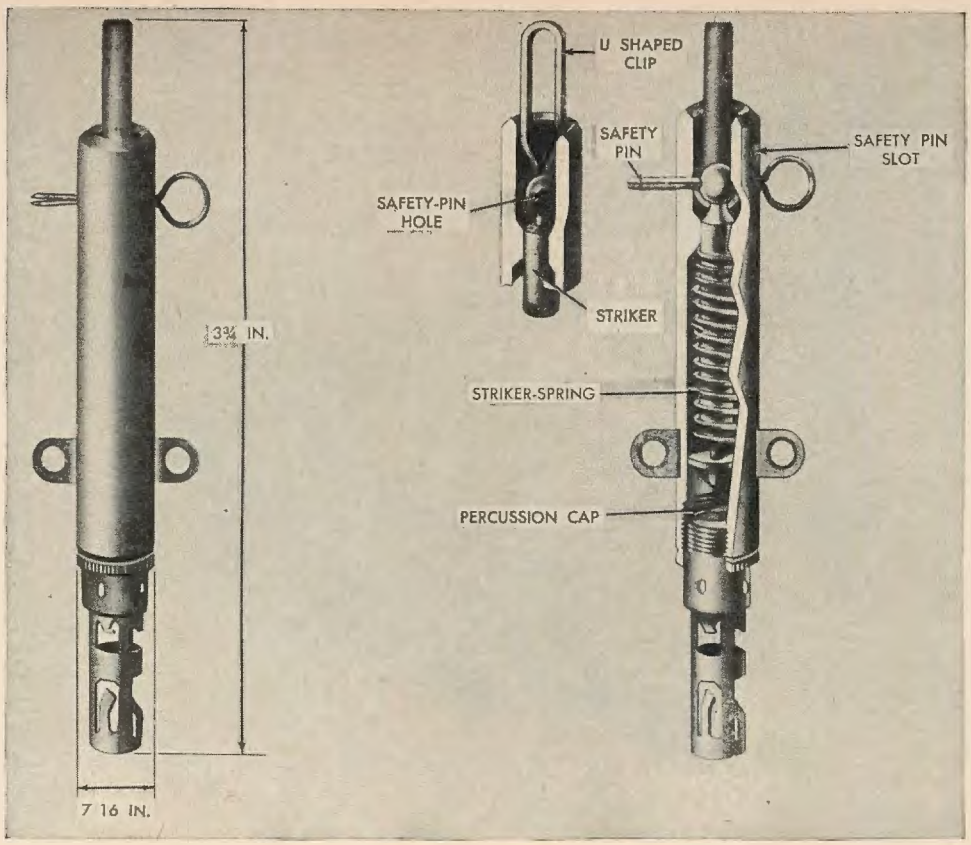


Figure 32. British pull fuze No. 4, Mark I.

Section IV. PULL, PRESSURE, PRESSURE-RELEASE FUZES

26. British Pull, Pressure, Pressure-Release Fuze No. 13, Mark I

a. Description. The British pull, pressure, pressure-release fuze No. 13, Mark I (fig. 33) is of the instantaneous, mechanical type. It consists of a rectangular, die-cast metal case, 4 inches long, 2 inches wide, and 1 inch high, containing a spring-loaded striker, an actuating pin that is pointed on the bottom with a pressure head on the top, and a shear pin. The actuating pin fits into a turret which, in turn, fits into a boss on the top of the fuze case. The pointed end of the actuating pin fits against a bevelled flange on the striker shaft. The actuating pin is perpendicular to the striker shaft. The head of the actuating pin has a threaded hole to take an adjustable extension rod with a pressure head on the top. The shear pin, with piano wire attached to either end, extends through the turret and the actuating pin. The turret can be rotated so that trip wires tied to the piano wire can lead out in any desired direction. A fuse adapter or detonator adapter with a built-in percussion cap is screwed into one end of the fuze. A safety clip extends through the fuze case between the striker and the percussion cap.

b. Employment. This fuze is used as an anti-lifting device and to actuate booby traps.

c. Functioning.

(1) *When set for pull.* A pull on one of the trip wires attached to the loop of the piano wire withdraws the shear pin (fig. 34), allowing the bevelled flange on the striker shaft to raise the actuating pin, releasing the spring-loaded striker against the percussion cap.

(2) *When set for pressure.* A pressure of 35 pounds, or more, on either the adjustable extension rod or the pressure head of the actuating pin shears the shear pin and snaps the striker shaft, just in front of the bevelled flange, releasing the spring-loaded striker against the percussion cap.

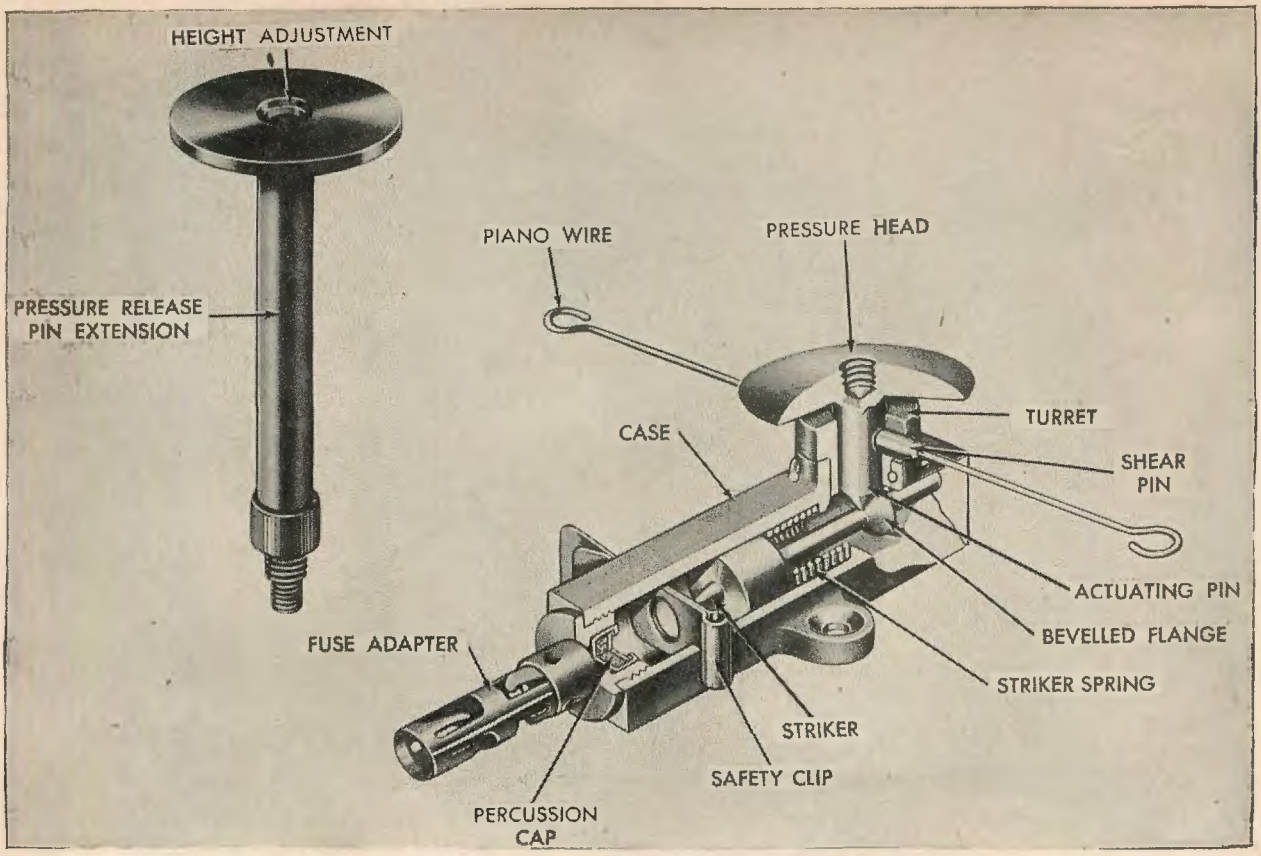


Figure 33. British pull, pressure, pressure-release fuze No. 13, Mark I.

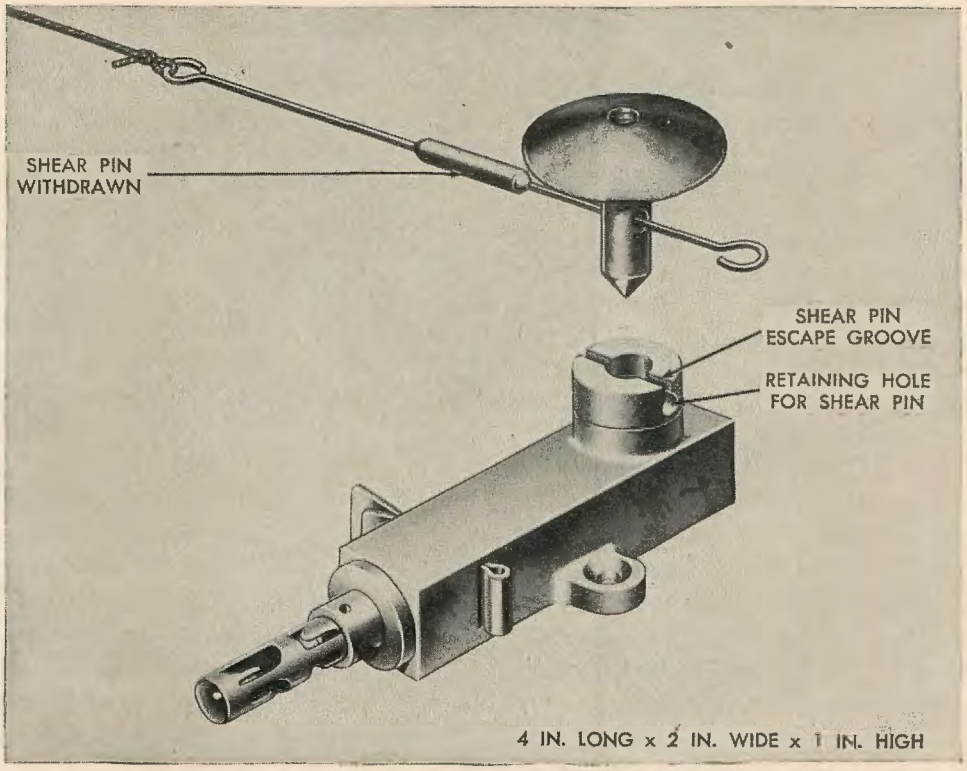


Figure 34. Actuating pin freed by withdrawing the shear pin.

(3) *When set for pressure release.* The shear pin is withdrawn. Removing a weight from the pressure head of the actuating pin allows the bevelled flange on the striker shaft to raise the actuating pin, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) *For pull.*

(*a*) Attach the fuze to an object.

(*b*) Attach time fuse or detonating cord to the fuse adapter or insert a detonator in the detonator adapter.

(*c*) Rotate the turret to the desired position and tie an anchored trip wire to the loop of the piano wire on either end of the shear pin.

(*d*) Withdraw the safety clip.

(2) *For pressure.*

(*a*) Attach the fuze to an object.

(*b*) Attach time fuse or detonating cord to the fuse adapter or insert a detonator in the detonator adapter.

(*c*) If the adjustable extension rod is used, adjust it upward until contact is made with the object to be booby-trapped.

(*d*) Withdraw the safety clip.

(3) *For pressure-release.*

(*a*) Attach the fuze to an object.

(*b*) Attach time fuse or detonating cord to the fuse adapter or insert a detonator in the detonator adapter.

(*c*) Place a weight of between 3 and 20 pounds on the pressure head of the actuating pin.

(*d*) Withdraw the shear pin and piano wire.

(*e*) Withdraw the safety clip.

Note. When set for pressure-release, the fuze will also function by pressure.

e. Neutralizing.

(1) *When set for pull.*

(*a*) See that the shear pin extends all the way through the turret.

(*b*) Cut the slack trip wires tied to the piano wire on either end of the shear pin.

(*c*) Insert the safety clip or a piece of sheet metal in the safety-clip slot.

(*d*) Cut the time fuse or detonating cord that connects the fuze to the charge or remove the detonator from the fuze, whichever action applies.

(2) *When set for pressure.*

(*a*) See that the shear pin extends all the way through the turret.

(*b*) Cut any slack trip wires that may be tied to the piano wire on either end of the shear pin.

(*c*) Insert the safety clip or a piece of sheet metal in the safety-clip slot.

(*d*) Cut the time fuse or detonating cord that connects the fuze to the charge or remove the detonator from the fuze, whichever action applies.

(3) *When set for pressure release.*

(*a*) Insert the safety clip or a piece of sheet metal in the safety-clip slot, being very careful not to disturb the weight resting on the pressure head of the actuating pin.

(*b*) Insert the shear pin or a nail through the turret in such a manner as to prevent any vertical movement of the turret.

(*c*) Cut the time fuse or detonating cord that connects the fuze to the charge or remove the detonator from the fuze, whichever action applies.

(*d*) Remove the weight from the pressure head of the actuating pin.

Caution: Any increase in weight on the pressure head of the actuating pin will snap the striker shaft, releasing the spring-loaded striker against the percussion cap.

f. Packing. One fuze and one adjustable extension rod are packed in a cardboard carton. Ten cartons are packed in a sheet-metal case, and 10 cases are packed in a metal box, 19 inches long, 8 inches wide, and 8 inches high. The total weight of the packed metal box is 43 pounds.

27. British Murray Pull, Pressure, Pressure-Release Fuze Mark I

a. Description. The British Murray pull, pressure, pressure-release fuze Mark I (fig. 35) is of the instantaneous, mechanical type and contains a spring-loaded striker with a lever release. It consists of a cylindrical metal case containing a spring-loaded striker that is held in place by either an L-shaped pressure plate or an L-shaped

pressure-release lever. A hole in the pressure plate engages a groove in the striker shaft when the pressure plate is raised off the fuze case. When the fuze is set for pressure, the pressure-release lever is not used. When the fuze is set for either pull or pressure-release, the pressure plate rests on the fuze case, in which position it does not engage the groove in the striker shaft, and the pressure-release lever engages in a notch in the striker shaft. When the fuze is set for pull, the pressure-release lever is held in place by a pull pin and a retaining belt, which hold the lever to the pressure plate. When the fuze is set for pressure release, the pressure-release lever is held in place by a weight placed on it. An empty cartridge case is held to the fuze by a threaded brass retaining collar. Time fuse, detonating cord, or a detonator may be inserted in the open end of the cartridge case. A cotter-pin type safety pin is provided for holding the pressure plate and the pressure-release lever in place. The fuze is 5½ inches long and 1⅜ inches high. A mounting hole is provided in the base of the fuze for attaching it to a firm object.

b. Employment. This fuze is used in antipersonnel mines and in booby traps.

c. Functioning.

(1) *When set for pressure (fig. 36).* Pressure on the raised pressure plate forces the pressure plate against the fuze case so that the hole in the pressure plate disengages from the groove in the striker shaft, releasing the spring-loaded striker against the percussion cap in the cartridge case.

(2) *When set for pull or pressure-release (figs. 37 and 38).* Pulling out the pull pin or removing a weight from the pressure-release lever, whichever applies, causes the pressure-release lever to pivot about its point of contact with the pressure plate under the force of the compressed striker spring until the lever clears the notch in the striker shaft, re-

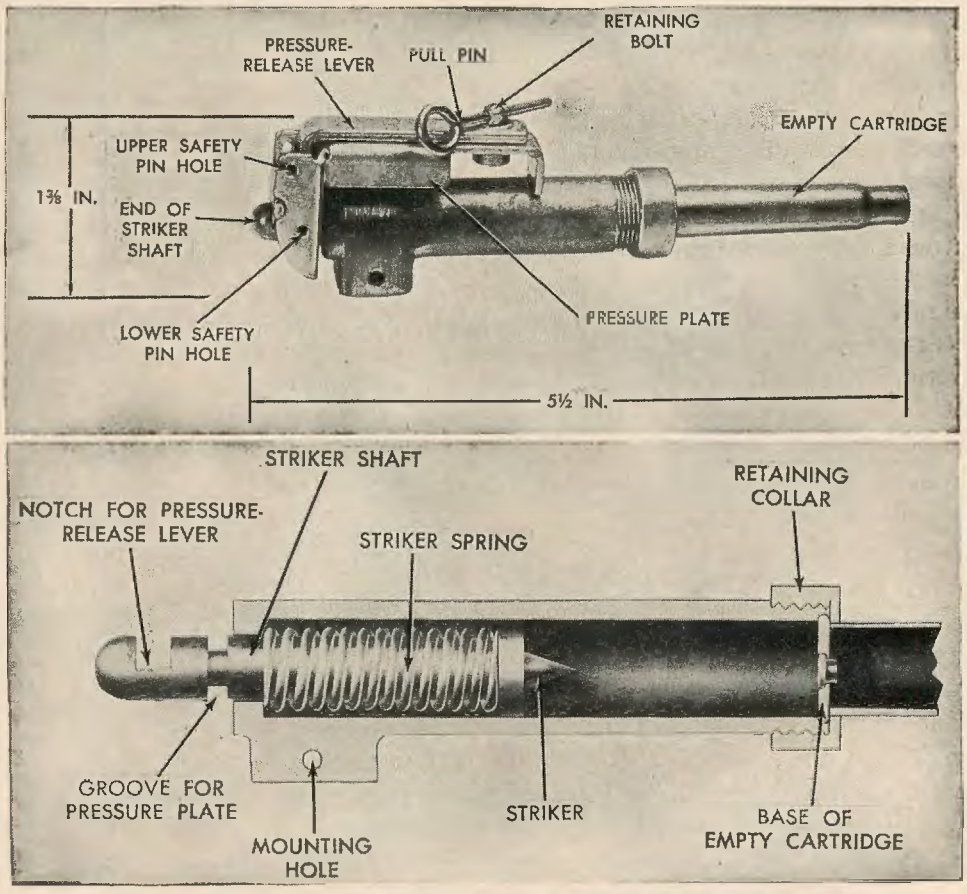


Figure 35. British Murray pull, pressure, pressure-release fuze Mark I.

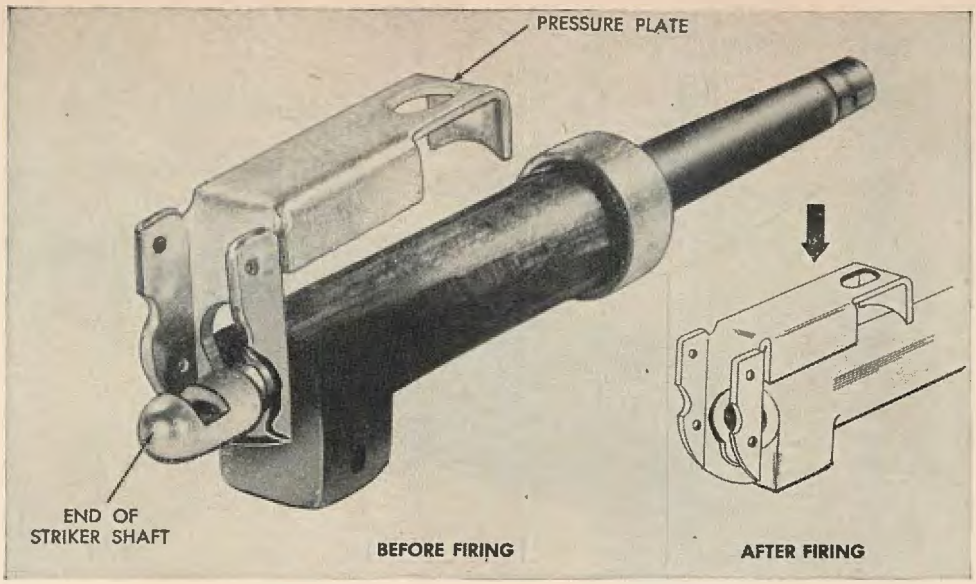


Figure 36. Murray fuze set for pressure.

leasing the spring-loaded striker against the percussion cap in the cartridge case.

d. Installing and Arming.

(1) *For pressure.*

(*a*) Cock the fuze by unscrewing the retaining collar, removing the cartridge case, and pushing the striker back with a small rod or the unsharpened end of a pencil until the narrow part of the hole in the pressure plate can engage the groove in the striker shaft. (The pressure-release lever is not used when the fuze is set for pressure.)

(*b*) Insert the safety pin through the lower safety-pin holes in the end of the pressure plate.

(*c*) Insert time fuse, detonating cord, or a detonator in the open end of the cartridge case.

(*d*) Replace the cartridge case and the retaining collar.

(*e*) Attach the fuze to an object.

(*f*) Withdraw the safety pin with rope or wire from a distance of 50 yards; friction between the hole in the pressure plate and the groove in the striker shaft

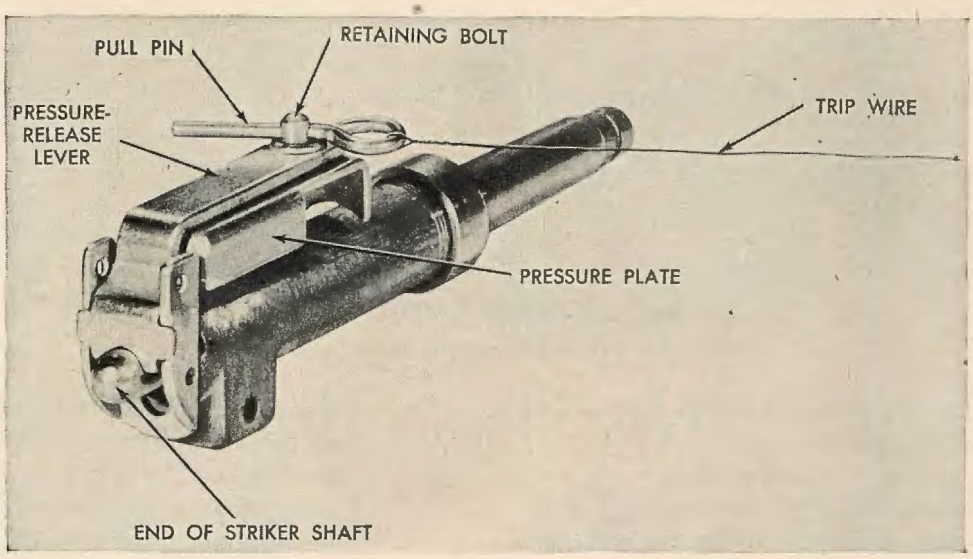


Figure 37. Murray fuze set for pull.

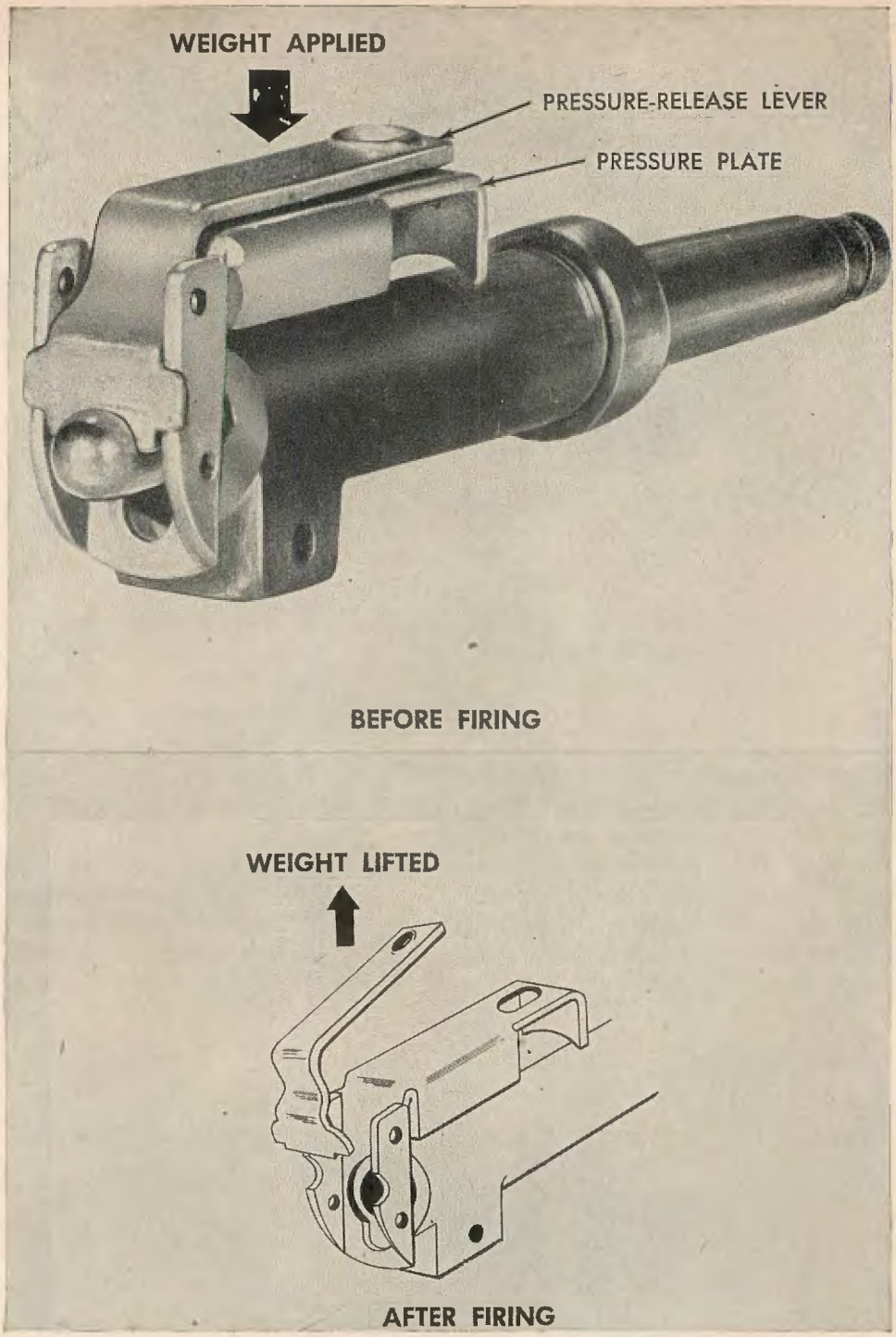


Figure 38. Murray fuze set for pressure release.

is the only thing that keeps the pressure plate in place.

(2) *For pull or pressure release.*

(*a*) Cock the fuze by unscrewing the retaining collar, removing the cartridge case, and pushing the striker back with a small rod or the unsharpened end of a pencil until the pressure-release lever, placed in position over the lowered pressure plate, engages the notch in the striker shaft.

(*b*) Insert the safety pin through the upper

safety-pin holes in the end of the pressure plate.

(*c*) Insert time fuse, detonating cord, or a detonator in the open end of the cartridge case.

(*d*) Replace the cartridge case and the retaining collar.

(*e*) Attach the fuze to an object.

(*f*) Insert the retaining bolt up through the holes in the horizontal portions of the pressure plate and the pressure-release lever, insert the pull pin through the hole in the top of the retaining bolt, and tie an anchored trip wire to the pull pin; or place a weight on the pressure-release lever, whichever applies.

(*g*) Withdraw the safety pin.

e. Neutralizing.

(1) *When set for pressure.*

(*a*) Insert the safety pin or a nail in the lower safety-pin holes in the pressure plate being very careful not to disturb the pressure plate, which is held in position only by friction.

(*b*) Unscrew the retaining collar and remove the cartridge case from the fuze.

(2) *When set for pull or pressure release.*

(*a*) Insert the safety pin or a nail in the upper safety-pin holes in the pressure plate, being careful not to disturb the pull pin or the weight on the pressure-release lever, whichever applies.

(*b*) Cut the slack trip wire or remove the weight from the pressure-release lever, whichever applies.

(*c*) Unscrew the retaining collar and remove the cartridge case from the fuze.

Section V. ELECTRICAL FUZES

28. British Electrical, Pressure-Pull Fuze No. 7, Mark I

a. Description. The British electrical, pressure-pull fuze No. 7, Mark I (fig. 39) is of the instantaneous, electrical type in which the closing of a switch completes the firing circuit between a battery and an electric detonator. It consists of a sheet-metal case containing a flat flashlight battery and a pressure-pull mechanism. On the top of the case are two terminals for making the connection to an electric detonator. The pressure-pull mechanism consists of a plunger that rides in a bushing in a boss on the side of the case. On the outer end of the plunger is a pressure-pull plate with two holes for attaching trip wires. An actuating pin is inserted through the inner end of the plunger. Each end of the actuating pin fits between the prongs of an inverted U-shaped bracket, forming a switch. Closing this switch by sliding the plunger either in or out connects the negative terminal on the fuze case to the battery. This completes the firing circuit as the positive terminal on the fuze case is permanently connected to the battery. A sping-loaded ball engages in an indentation in the side of the plunger and the amount of resistance offered by this ball-release catch is adjustable from a minimum of 5 pounds to a maximum of 30 pounds by screwing in an adjusting screw. A safety pin is inserted through the boss, the bushing, and the plunger. It is held in place by a retaining nut. An extension rod may be screwed into the end of the plunger.

b. Employment. This fuze was designed for employment with booby traps. It may be used as a pressure fuze under a pressure board or as a pull fuze, with trip wires attached to the holes in the pressure-pull plate.

c. Functioning. A pressure or pull of 5 pounds, or more, on the pressure-pull plate will slide the plunger either in or out so that the actuating pin makes contact with the prongs of the U-shaped brackets, completing the firing circuit between the battery and the electric detonator.

d. Installing and Arming.

(1) Install the fuze for either pressure or pull.

(2) Adjust the amount of resistance offered by the spring-loaded ball-release catch by screwing the adjusting screw all the way in and then backing off until the desired amount of resistance is obtained. (The range of resistance is from a maximum of approximately 30 pounds with the adjusting screw all the way in to a minimum of 5 pounds with the adjusting screw all the way out.) After setting the adjusting screw, always lock it by means of the lock nut.

(3) Connect the leads of an electric detonator to the terminals of the fuze case.

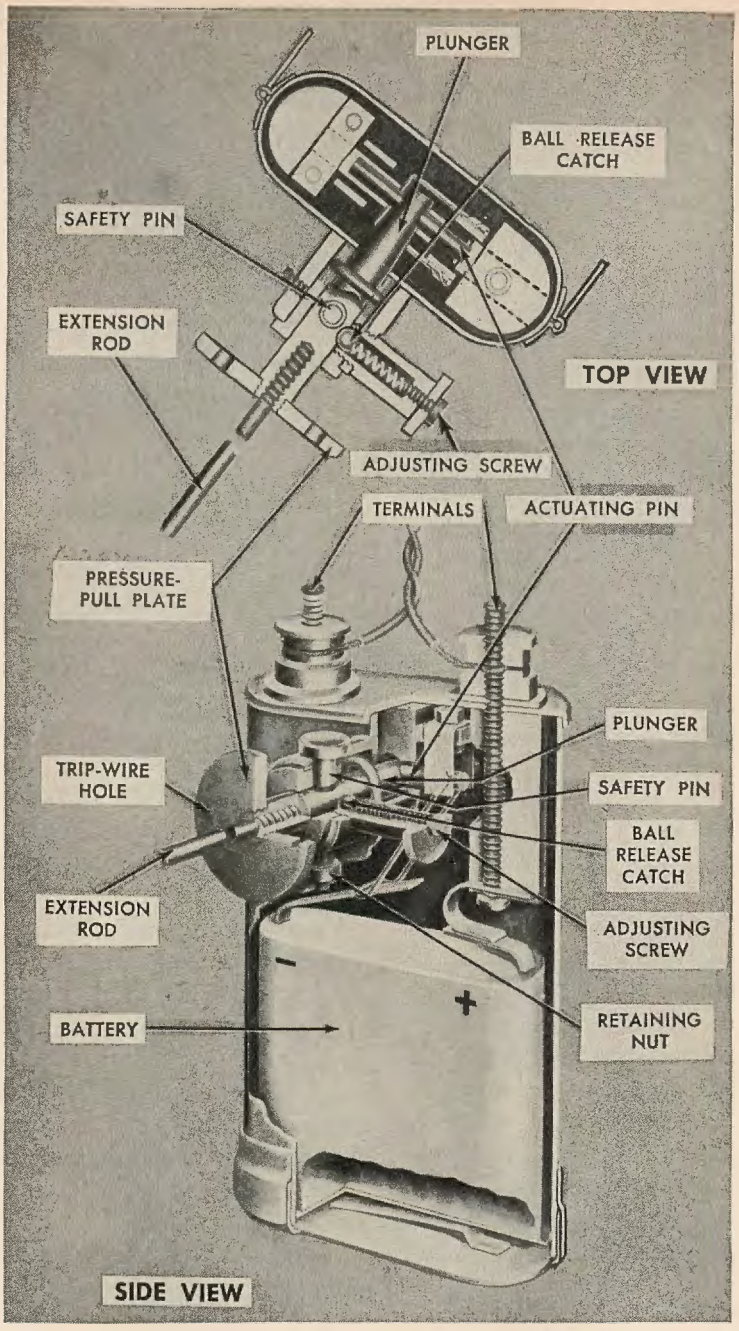


Figure 39. British electrical, pressure-pull fuze No. 7, Mark I.

(4) Unscrew the retaining nut from the safety pin and remove the safety pin.

e. Neutralizing.

(1) Cut the trip wires, if any.

(2) Cut the leads from the fuze to the electric detonator.

f. Packing. Ten fuzes and 16 spare batteries are packed in a wooden box, 15 inches long, 7 inches wide, and 4 inches high.

29. British Electrical Pressure, Contact-Strip Fuze

a. Description. The British electrical pressure, contact-strip fuze (fig. 40) is of the instantaneous, electrical type in which the closing of a switch completes the firing circuit between a battery and an electric detonator. It consists of two rubber tubes, ½ inch in diameter and 33 inches long. Each tube contains two brass strips that are held

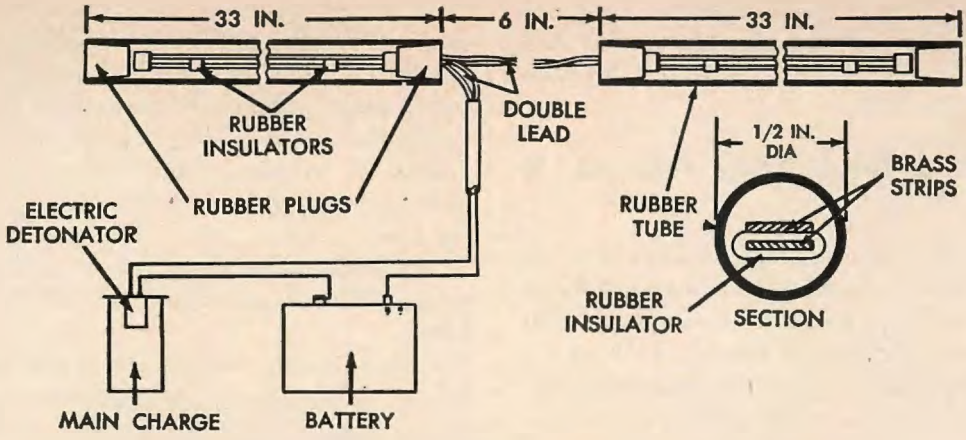


Figure 40. British electrical pressure, contact-strip fuze.

apart by rubber insulators. The ends of the rubber tubes are closed by rubber plugs. Each pair of brass strips are wired into a series circuit with a 9-volt battery and an electric detonator. When the brass strips in either tube make contact with one another, the circuit is closed.

b. Employment. This fuze is normally used with charges to damage or destroy wheeled or tracked vehicles. It is laid across a road in the probable path of traffic.

c. Functioning. A vehicle passing over either of the two tubes forces the brass strips into contact, completing the firing circuit between the battery and the electric detonator.

d. Installing and Arming. Before wiring the electric detonator into the circuit, test the brass strips with a galvonometer to determine whether or not they are in contact, that pressure produces the proper contact, and that contact is not maintained after the pressure ceases; then set up the circuit as shown in figure 40. This fuze should not be buried.

e. Neutralizing. Cut the wires to the battery or to the electric detonator.

Section VI. CHEMICAL FUZES

30. British Chemical, Pressure Fuze E. P. (Egyptian Pattern) No. 2

The British chemical, pressure fuze E. P. No. 2 is of the instantaneous, chemical type. Since this fuze has a high explosive content it is also used as an antipersonnel mine and is, therefore, fully discussed in paragraph 45 as the British antipersonnel mine E. P. No. 5.

31. British Chemical, Pressure Fuze No. 98, Mark I

a. Description. The British chemical, pressure fuze No. 98, Mark I (fig. 41) is of the instantaneous, chemical type and contains an ampoule of chemical. It consists of a metal block with the ampoule inserted in one end, and a detonator, which makes contact with the ampoule, in the other end. A pressure pin is inserted in the top of the metal block directly over the ampoule. Both the pressure pin and the detonator protrude from the metal block.

b. Employment. This fuze is designed specifically for use in the Hawkin's grenade mine No. 75, Mark II (par. 40).

c. Functioning. Pressure on the pressure pin crushes the ampoule of chemical. A chemical reaction takes place producing a flame which sets off the detonator.

d. Installing and Arming.

(1) Lift the pressure pin and insert the ampoule of chemical in the metal block.

(2) Insert the detonator in the opposite end of the metal block.

e. Neutralizing. Remove the detonator and the ampoule of chemical from the metal block.

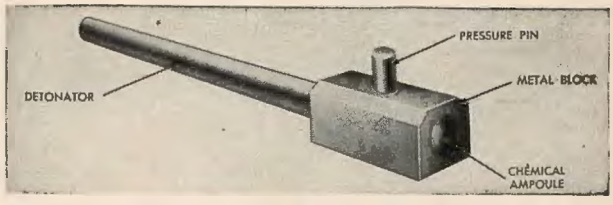


Figure 41. British chemical, pressure fuze No. 98, Mark I.

f. Packing. Twenty-four of these fuzes are packed in a sheetmetal case and are carried in a wooden crate containing 12 Hawkin's grenade mines No. 75, Mark II.

32. British Lead-Break Delay Fuze No. 9, Mark I

a. Description. The British lead-break delay fuze No. 9, Mark I (fig. 42) contains a spring-loaded striker with a lead-break release. It consists of a cylindrical metal case, ⅜ inch in diameter and 4⅛ inches long, that contains a striker, a lead break, and a striker spring that is in tension. The striker shaft is fastened to the lead break, which is secured to the top of the fuze case. The lead break itself is a cylindrical lead rod with a neck, a portion that is turned down to a much smaller diameter. The bottom of the striker spring is fastened to the bottom of the fuze case, and the top of the striker spring is fastened to a hook formed in the striker shaft. A safety pin is inserted through the fuze case and the striker shaft and is held in place by a safety-pin clip. With the safety pin in place there is no tension on the lead break. A tag on the safety pin has an inscription showing the delay period. Eight different delay periods are available which vary according to the prevailing atmospheric temperature (table I). A fuse or detonator adapter with a built-in percussion cap is attached to the base of the fuze.

b. Employment. This fuze is used in delayed-action demolition work and in booby-trap installations.

c. Functioning. When the safety pin is withdrawn, the tension in the striker spring is taken by the lead break. The neck in the lead break stretches until it fails, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Refer to table I and select the fuze that will give the desired delay period at the prevailing atmospheric temperature.

(2) Insert time fuse, detonating cord, or a detonator in the adapter.

(3) Withdraw the safety pin.

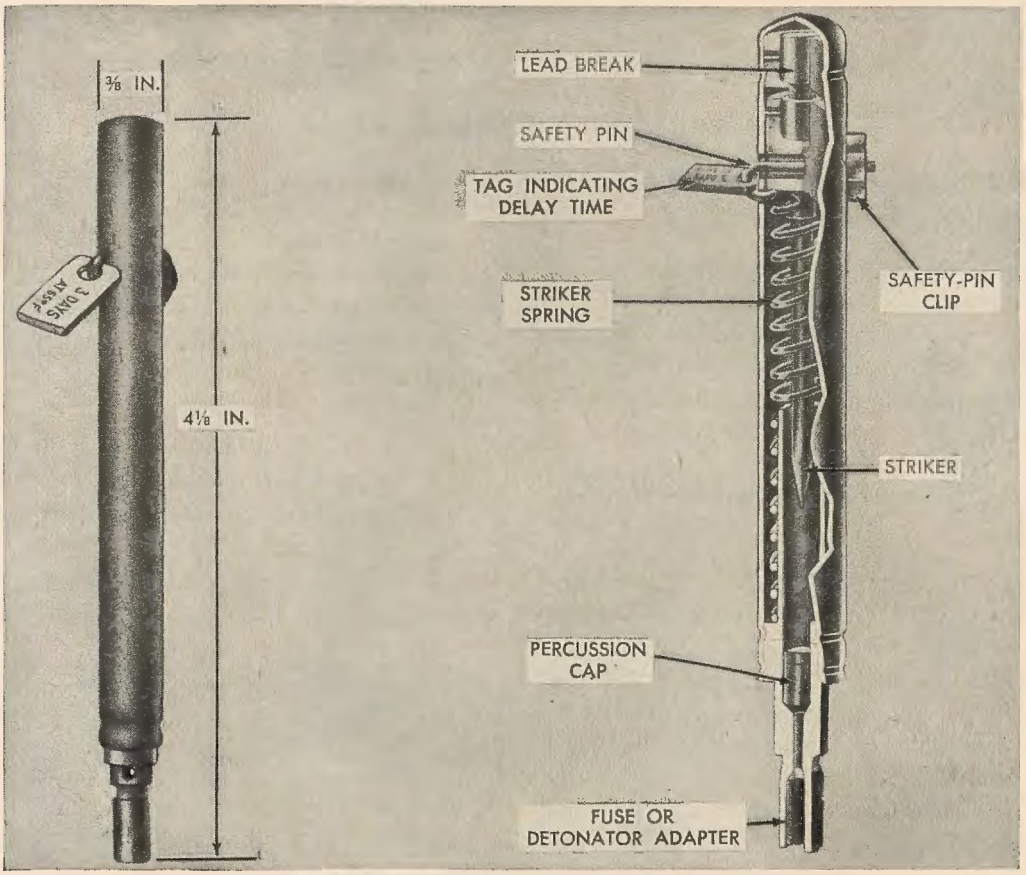


Figure 42. British lead-break delay fuze No. 9, Mark I.

e. Neutralizing. This fuze cannot be neutralized, as the safety-pin hole in the striker shaft will not line up with the safety-pin hole in the fuze case once the neck in the lead break has started to stretch. If the fuze is connected to the charge by time fuse or detonating cord, cut the fuse or cord.

f. Packing. Ten fuzes of various delay periods are packed in a sheet-metal case. Fifty cases are packed in a wooden box, 29½ inches long, 9½ inches wide, and 5½ inches high. The total weight of the packed wooden box is 61 pounds.

Table I. Various Delay Periods at Different Atmospheric Temperatures for the British Lead-Break Delay Fuze No. 9, Mark I

Atmospheric temperature (° F)	Delay period							
	Hours				Days			
35	3	16	32	64	8	19	38	75
45	2	11	23	46	6	13	27	54
55	1½	8	17	33	4	10	19	39
*65	1	6	12	24	3	7	14	28
75	¾	4	8	17	2	5	10	20
85	½	3	6	12	1½	4	7	14
95	½	2	4½	8	1	2½	5	10
105	½	1½	3	6	½	2	4	7

* This temperature is generally used in marking the tags on the fuzes. Correction to the local prevailing temperature should be made by using table I.

33. British Chemical, Delay Pencil Fuze No. 10, Mark I

a. Description. The British chemical, delay pencil fuze No. 10, Mark I (fig. 43) is of the delay, chemical type and contains a spring-loaded striker with a wire release. It consists of a cylindrical case, 5/16 inch in diameter and 5 inches long, that contains a spring-loaded striker, a striker-retaining wire, and a glass ampoule of chemical. The lower part of the fuze case, containing the striker, is of aluminum, while the upper part, containing the ampoule, if of copper. The striker-retaining wire runs from the striker shaft into the upper part of the fuze case past the ampoule of chemical. A safety bar is inserted through the fuze case between the striker and the percussion cap. The color of the safety bar as given in table II indicates the delay period. An inspection hole in the side of the fuze case between the striker and the safety bar is for the purpose of seeing if the striker has been released. A fuse or detonator adapter with a built-in percussion cap is attached to the base of the fuze.

b. Employment. This fuze is used in delayed-action demolition work and in booby-trap installations.

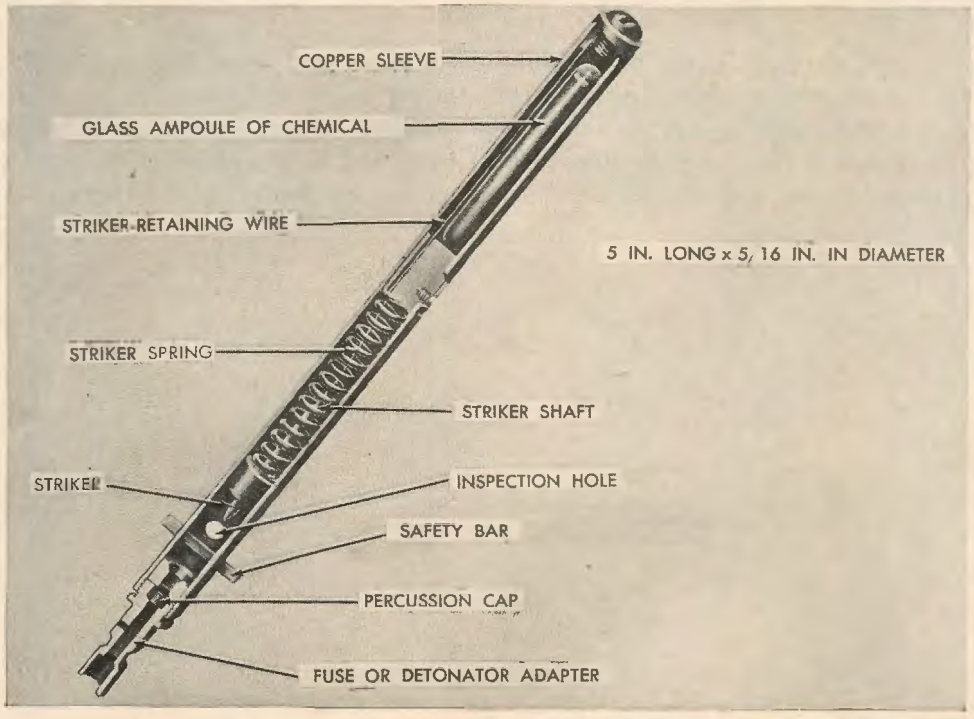


Figure 43. British chemical, delay pencil fuze No. 10, Mark I.

c. Functioning. When the copper part of the fuze case is crushed, the glass ampoule of chemical breaks, and the chemical eats through the striker-retaining wire, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Refer to table II and select the fuze that will give the desired delay period at the prevailing temperature.

(2) Look through, or pass a nail through, the inspection holes to make sure the striker has not been released.

(3) Insert time fuse, detonating cord, or a detonator in the adapter.

(4) Crush the upper part of the fuze flat, being careful not to puncture it or break it loose from the lower part of the fuze case. This breaks the glass ampoule of chemical and starts the chemical reaction that eats through the striker-retaining wire.

(5) Withdraw the safety bar.

Table II. Various Delay Periods at Different Atmospheric Temperatures for the British Chemical, Delay Fuze No. 10, Mark I

Atmospheric temperature		Safety-bar colors					
° F	° C	Black*	Red	White	Green	Yellow	Blue
0	−18		86 min	20. 7 hr	50 hr	122 hr	
20	− 7		54 min	8 hr	21 hr	46 hr	159 hr
40	4	18 min	34 min	3. 3 hr	9. 5 hr	20 hr	58 hr
60	16	12 min	23 min	100 min	4. 5 hr	8. 9 hr	24 hr
70	21	9 min	19 min	80 min	3. 3 hr	6. 1 hr	16. 7 hr
80	27	8 min	15. 5 min	64 min	2. 4 hr	4. 3 hr	11. 5 hr
90	32	6. 5 min	13 min	53 min	1. 8 hr	3. 2 hr	8. 1 hr
100	38	5. 5 min	11 min	43 min	1. 3 hr	2. 3 hr	5. 9 hr
110	43	4. 5 min	9. 5 min	37 min	1. 0 hr	1. 7 hr	4. 7 hr

* Issued for training only.

Note. Delay periods may vary 25 percent either way. Do not use a fuze with a blue-colored safety bar if the temperature is likely to be below freezing when the explosion is due to occur.

e. Neutralizing. This fuze cannot be neutralized safely. If it is essential to neutralize it, insert the safety bar or a nail in the inspection holes or, if the fuze is connected to the charge by time fuse or detonating cord, cut the fuse or cord.

f. Packing. Five fuzes are packed in a sheet-metal case. One hundred and fifty cases are packed in a wooden box, 16 inches long, 13 inches wide, and 8 inches high. The total weight of the packed wooden box is 57.5 pounds.

Chapter 6

MINES

Section I. ANTITANK MINES

34. British G. S. Antitank Mine, Mark II

a. Description. The British G. S. (general service) antitank mine, Mark II (fig. 44) consists of a steel case, 7½ inches in diameter and 3¼ inches high, with a rounded top and a flat bottom. The case is dark green in color, except for the bottom, which is yellow with a red and green cross. The fuze well is centrally located in the bottom of the case and is surrounded by a booster charge. Two filler plugs are also located in the bottom of the case. This mine uses the pressure fuze, antitank, No. 1, Mark I (par. 15). A pressure cover fits over the case, and is held in place by four locking cover pins on the side of the case. A spring-like plate riveted to the underside of the cover exerts a light pressure on the case so as to hold the cover firmly against the locking cover pins. The mine weighs a total of 8.25 pounds, including 4 pounds of explosive.

b. Employment. This mine is employed against vehicles and light tanks in tactical and hasty mine fields and in road blocks.

c. Functioning.

(1) A pressure of 350 pounds, or more, on the pressure cover crushes the brass pressure cap of the fuze.

(2) The pressure head and the plunger of the fuze are forced down, pushing aside the four prongs on the brass safety sleeve and compressing the striker spring.

(3) The striker-retaining balls are forced outward into a recess in the plunger, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Unscrew the shipping plug from the fuze well in the bottom of the mine.

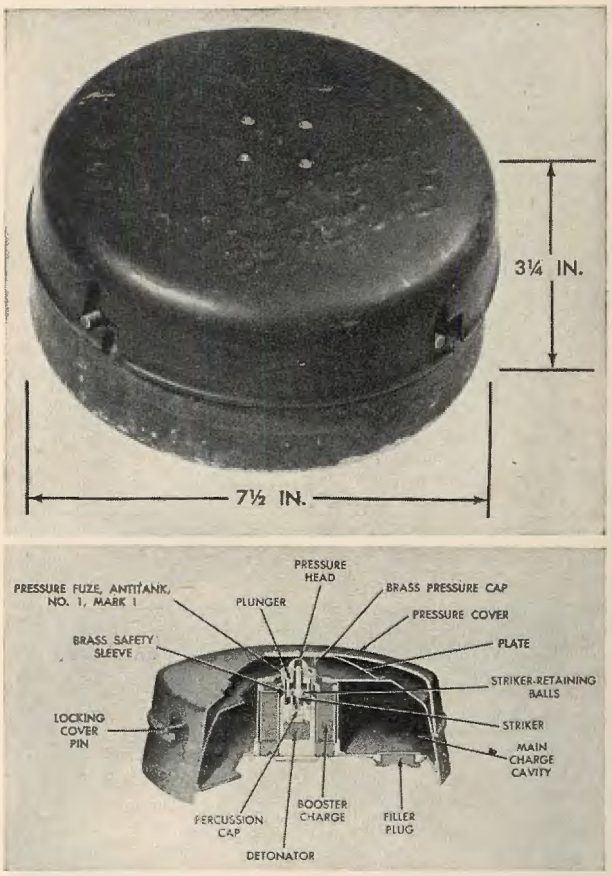


Figure 44. British G. S. antitank mine, Mark II.

(2) Insert the fuze in the fuze well and screw it in finger-tight.

(3) Place the mine in a hole so the cover is flush with the surface of the ground.

e. Neutralizing.

(1) Search for and neutralize any activating fuzes.

(2) Unscrew the fuze from the bottom of the mine.

f. Packing. Eight mines and eight fuzes are packed in a steel case.

35. British G. S. Antitank Mine, Mark V

a. Description. The British G. S. antitank mine, Mark V (figs. 45 and 46) consists of a steel case, 8 inches in diameter and 4 inches high, which is fitted with either the Mark I or the Mark II pressure spider. A circular sheet-metal inner wall separates the main charge from the outer wall of the case. The fuze well is centrally located in the top of the case and is covered by a protective cap which is seated on a rubber washer. This mine uses the pressure fuze, antitank No. 3, Mark I (par. 17). The mine weighs a total of 8.75 pounds, including 4.5 pounds of explosive.

Figure 45. British G. S. antitank mine, Mark V with pressure spiders.

b. Employment. This mine is employed in large tactical mine fields and in hasty road blocks against vehicles and light tanks. Small units use it for security.

c. Functioning. A pressure of from 350 to 450 pounds on the pressure spider crushes the protective cap over the fuze and shears the shear pin, releasing the spring-loaded striker against the percussion cap and firing the mine.

Note. The actuating pressure depends on the point of application. It is possible for a running man to set off this mine by striking the outer edge of the pressure spider.

d. Installing and Arming.

(1) Remove the pressure spider (fig. 47) and the protective cap.
(2) Place the mine in a hole so the top of the pressure spider, when replaced, will be less than 1 inch below the surface of the ground.
(3) Remove the paper sealing the fuze well.
(4) Inspect the fuze to see that the shear pin is in position and has not been entirely or partially sheared.
(5) Withdraw the safety pin.
(6) Insert the fuze in the fuze well of the mine. It should fit easily; do not use force.
(7) Replace the protective cap so it rests on the rubber washer.
(8) Replace the pressure spider, making sure the spider-locking pins engage in the slots in the spider. Be careful not to exert any pressure on the fuze.

e. Neutralizing.

(1) Search for and neutralize any activating fuzes.
(2) Remove the pressure spider and the protective cap, being careful not to exert any pressure on the fuze.
(3) Insert the safety pin or a nail in the safety-pin hole.
(4) Remove the fuze from the mine.

f. Packing. Five of these mines are packed in a wooden box. The fuzes are packed separately, 20 to a wooden box.

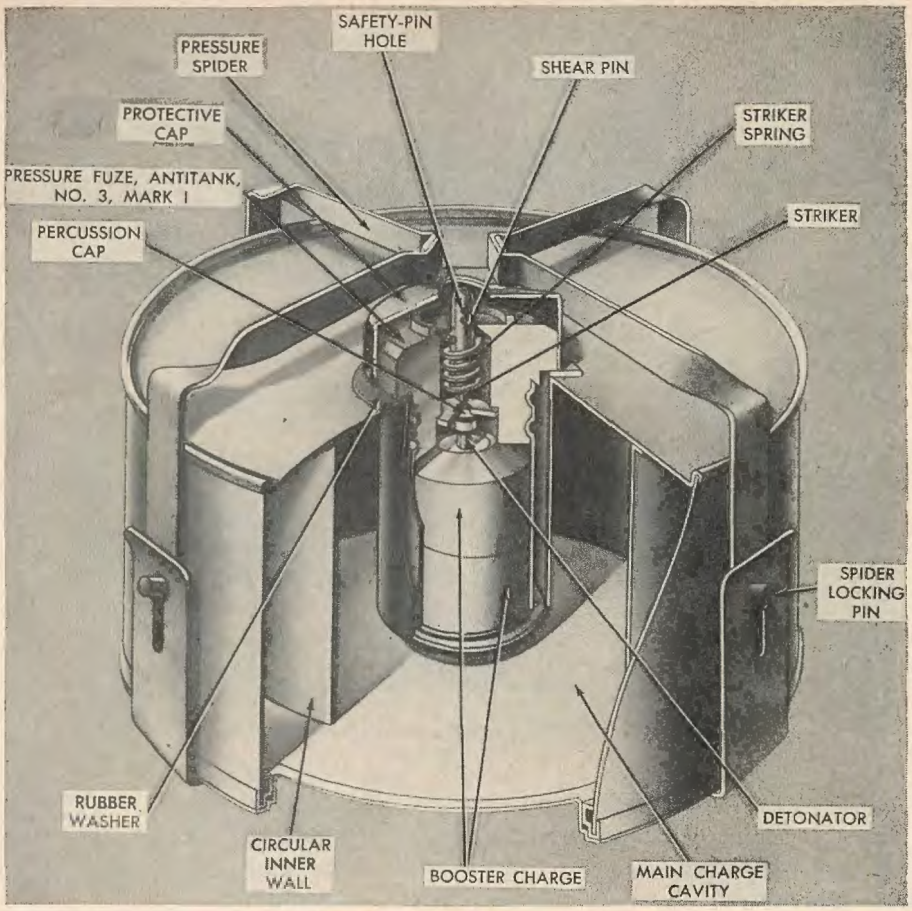


Figure 46. Cutaway view of British G. S. antitank mine, Mark V.

Figure 47. Removing the pressure spider.

36. British G. S. Antitank Mine, Mark V HC

The British G. S. antitank mine, Mark V HC (higher content) is identical to the G. S. antitank mine, Mark V (par. 35), except that it has explosive on both sides of the circular inner wall in the case, containing a total of 8.25 pounds of explosive compared to 4.5 pounds in the G. S. antitank mine, Mark V.

37. British G. S. Antitank Mine, Mark Vc

The British G. S. antitank mine, Mark Vc is identical to the G. S. antitank mine, Mark V (par. 35), except that it is fitted with a Mark IV pressure cover (fig. 49) instead of a pressure spider. It contains the same amount of explosive.

38. British Antitank Mine E. P., Mark V

a. Description. The British antitank mine E. P. (Egyptian pattern), Mark V (fig. 48) consists of a steel case with rounded edges. This mine uses the chemical, pressure fuze E. P. No. 2, which is fully discussed in paragraph 45 as the British antipersonnel mine E. P. No. 5, and is fitted with the Mark II pressure cover. The fuze well is centrally located. The mine, with the

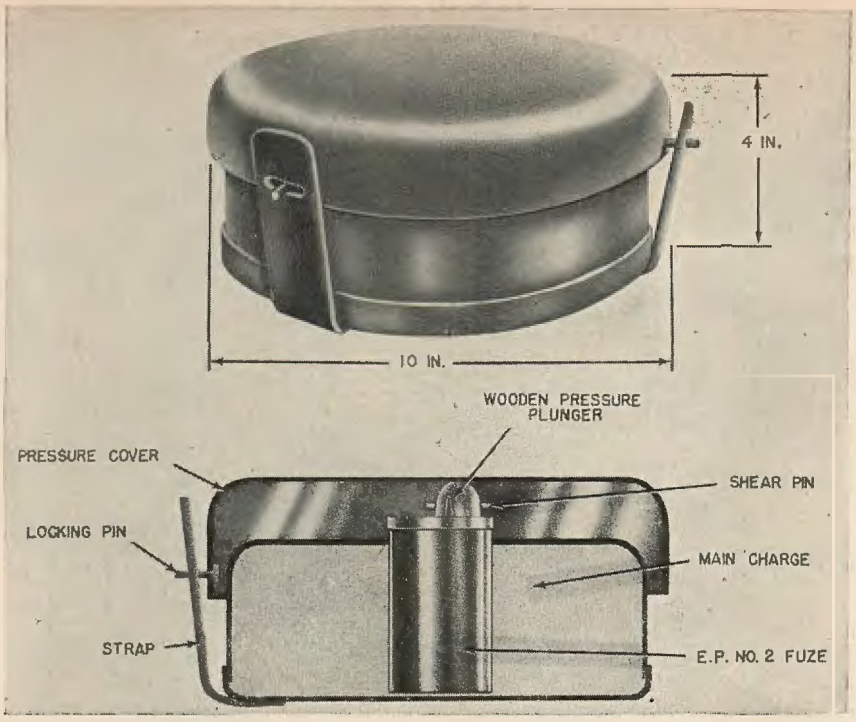


Figure 48. British antitank mine E. P., Mark V.

pressure cover, is 10 inches in diameter and 4 inches high. It contains a main charge of 4.25 pounds of explosive.

b. Employment. This mine is employed in large tactical mine fields and in hasty road blocks. Small units use it for security.

c. Functioning. Pressure on the pressure cover shears the sheer pin of the fuze and depresses the wooden pressure plunger, crushing the glass ampoule of chemical. A chemical reaction takes place producing a flame which sets off the detonator, firing the mine.

d. Installing and Arming.

(1) Remove the pressure cover, the protective cap, and the paper sealing the fuze well.

(2) Place the mine in a hole so the pressure cover, when replaced, will be flush with the surface of the ground.

(3) Prepare the fuze in accordance with the procedure in paragraph 45.

(4) Insert the fuze in the fuze well of the mine. It should fit easily; do not use force.

(5) Gently lower the wooden pressure plunger into the well in the top of the fuze until it rests on the shear pin.

(6) Replace the pressure cover, being careful not to depress the wooden pressure plunger.

e. Neutralizing.

(1) Search for and neutralize any activating fuzes.

(2) Remove the pressure cover.

(3) Remove the wooden pressure plunger from the fuze.

Figure 49. British G. S. antitank mine, Mark IV.

(4) Remove the fuze from the mine and pull out the detonator by the tape ends projecting out of the fuze well.

39. British G. S. Antitank Mine, Mark IV

The British G. S. antitank mine, Mark IV (fig. 49) uses the pressure fuze No. 3, Mark I (par. 17) and is fitted with the Mark IV pressure cover. The mine case is identical to the Mark V case (fig. 46), except that it lacks the circular inner wall. The mine, with the pressure cover, is 8 inches in diameter and 5 inches high, and weighs a total of 12.5 pounds, including 8.25 pounds of explosive. Its employment, functioning, installing and arming, and neutralizing are the same as for the G. S. antitank mine, Mark V (par. 35).

Section II. DUAL-PURPOSE MINES

40. British Hawkin's Grenade Mine No. 75, Mark II

a. Description. The British Hawkin's grenade mine No. 75, Mark II (fig. 50) consists of a steel case containing a main charge of 1.5 pounds of explosive and a booster charge. A filler cap is located in the end of the case. The top of the case is fitted with two fuze wells which lie flat in a V-shape. These fuze wells are covered with a pressure plate with a longitudinal ridge. Two chemical, pressure fuzes No. 98, Mark I (par. 31) are employed in this mine. Both fuzes are held in the fuze wells by means of a fuze pin. The mine is 7 inches long, 4 inches wide, and 2½ inches high, and has a total weight of 3 pounds, including the explosive. The case is painted either an olive drab or a dark brick red.

b. Employment. This mine is employed in security and protective type mine fields. It is also installed in tactical mine fields (in pairs and groups of four) and in road blocks. One mine will seriously injure a man stepping on it. Mines laid in pairs will disable trucks and break the tracks of light tanks. Four mines laid together may break the track of a medium tank.

c. Functioning. A pressure of from 80 to 100 pounds on the pressure plate causes it to bend, forcing the pressure pin of one fuze, or both, against the ampoule of chemical and crushing it. A chemical reaction takes place producing a flame which sets off the detonator, firing the mine.

d. Installing and Arming.

(1) Insert the ampoules and detonators in the fuzes.

(2) Insert the fuzes in the fuze wells under the pressure plate, pushing in the detonator end first (fig. 51.).

(3) Insert the fuze pin through the holes in the ends of the fuze wells (fig. 52).

(4) Place the mine in the ground with the filler cap pointing in the direction of the opposing forces. When installing the mines in pairs, place one mine on top of the other. Make sure that the pressure plate of the upper mine is flush with the surface of the ground.

e. Neutralizing. Withdraw the fuze pin and pull out the fuzes.

f. Packing. Twelve mines, 24 fuzes, and 24 detonators are packed in a steel case (fig. 53). The total weight of the packed case is 39 pounds.

41. British Hawkin's Grenade Mine No. 75, Mark I

The British Hawkin's grenade mine No. 75, Mark I (fig. 54) is an earlier model of the Hawkin's grenade mine No. 75, Mark II (par. 40). The fuze wells are located parallel to each other instead of in a V-shape as in the Mark II. The fuze (fig. 55) is similar to the chemical, pressure fuze No. 98, Mark I (par. 31) but lacks the metal block with its pressure pin. The pressure plate has a transverse groove instead of a longitudinal ridge. In all other characteristics, this mine is similar to the Hawkin's grenade mine No. 75, Mark II.

Section III. ANTIPERSONNEL MINES

42. British Antipersonnel Mine No. 5, Mark I

a. Description. The British antipersonnel mine No. 5, Mark I (fig.56) consists of a cylindrical, shellacked cardboard case, 2 inches in diameter and 3½ inches high, painted either brown or white with one red and one green stripe around the bottom half. The mine has a total weight of 8 ounces, including a 6.75-ounce main charge and a 0.25-ounce booster charge. The case has a centrally located cardboard fuze well for insertion

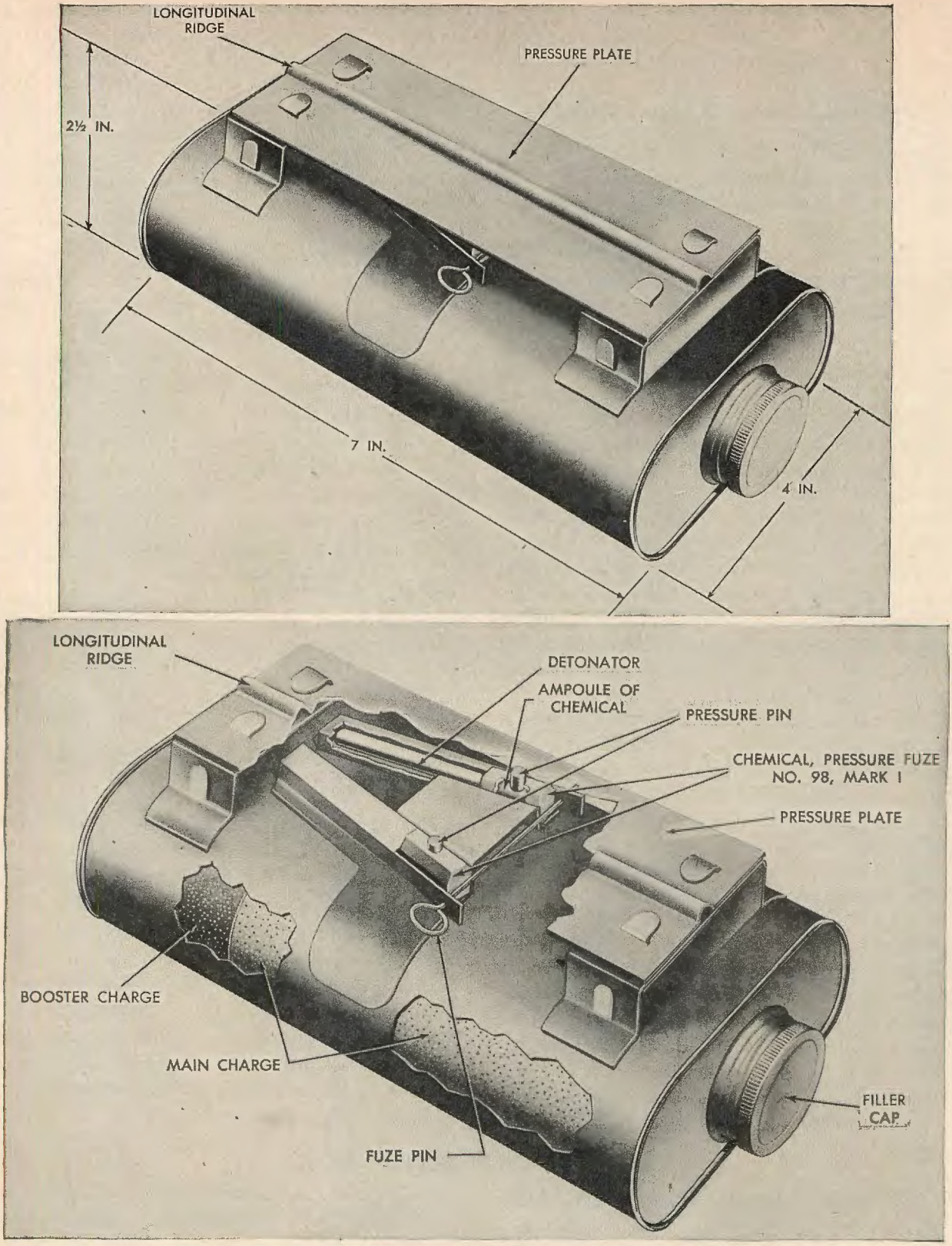


Figure 50. British Hawkin's grenade mine No. 75, Mark II.

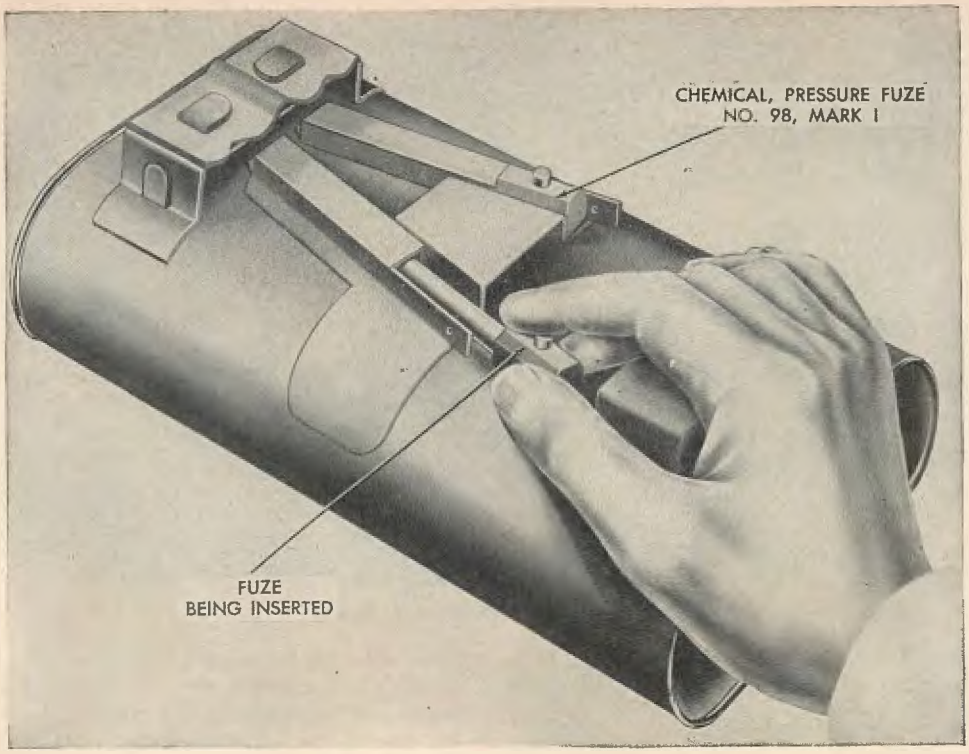


Figure 51. Inserting the fuzes.

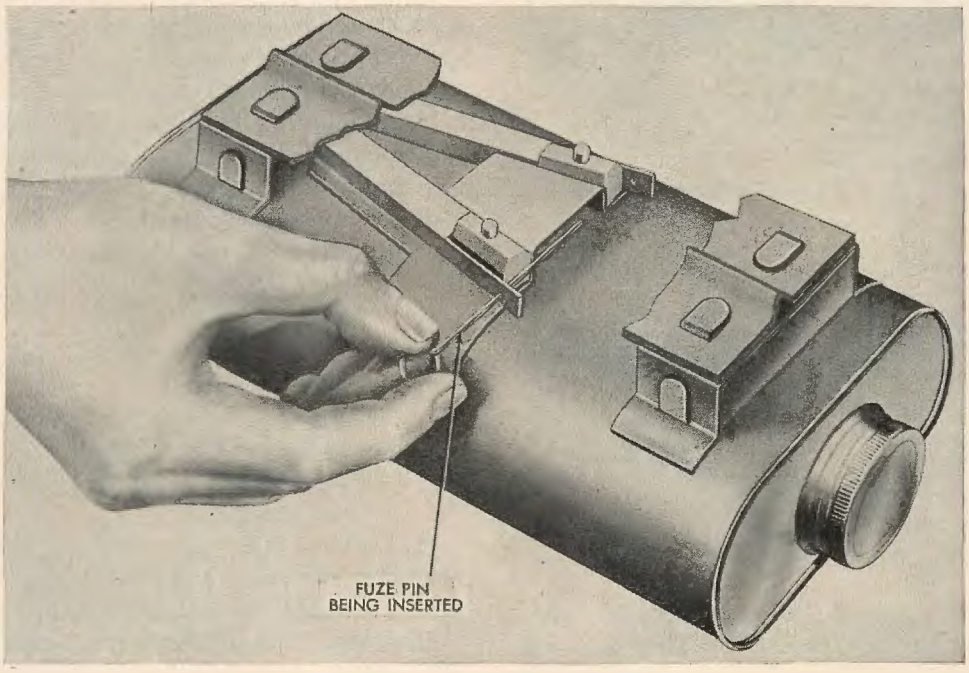


Figure 52. Inserting the fuze pin.

Figure 53. Mines, fuzes, and detonators packed in a steel case.

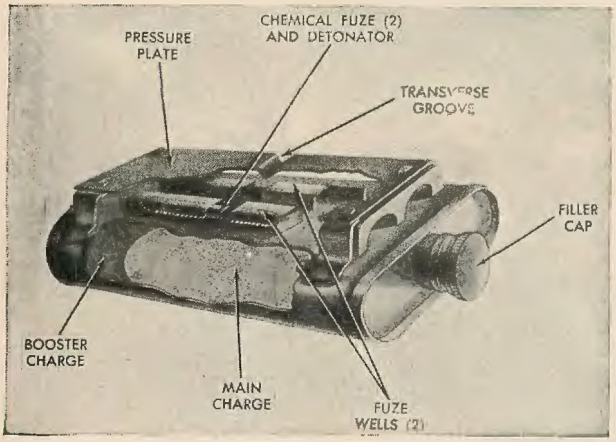


Figure 54. British Hawkin's grenade mine No. 75, Mark I.

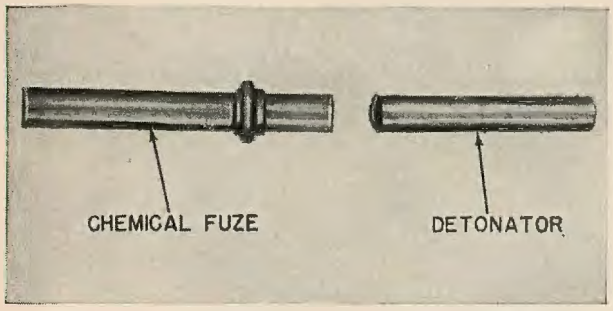


Figure 55. Chemical fuze and detonator.

of a percussion-cap-and-detonator assembly and a pressure fuze No. 89 (par. 19). This fuze well has a large enough diameter to permit a loose fit of the ebonite case of the fuze and to permit lateral movement of the striker-retaining balls.

Note. The training model for this mine is the alarm mine (M) No. 5, Mark I, which weighs only 2 ounces. It contains a smoke charge instead of explosive. The two mines are identical in outward appearance except that the case of the alarm mine is painted black and has the letters "ALARM MINE (M)" stenciled on it in white. Early models of the alarm mine were painted red.

b. Employment. This mine is laid on trails and roads to cause casualties among foot troops. It will blow off the tires of vehicles.

c. Functioning. A pressure of from 6 to 12 pounds on the pressure plate of the fuze forces the ebonite case down through the collar until the striker-retaining balls clear the collar, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Place the mine in a hole so the top of the mine will be just below the surface of the ground.
(2) Remove the wooden shipping plug from the fuze well.
(3) Insert the percussion-cap-and-detonator assembly in the fuze well.
(4) Insert the fuze so the collar rests on top of the mine.

e. Neutralizing. Carefully lift the fuze from the mine and remove the percussion-cap-and-detonator assembly from the fuze well.

Caution: Do not exert any pressure on the movable collar. The collar has to move only a fraction of an inch to free the striker-retaining balls.

f. Packing. There are two methods of packing this mine:

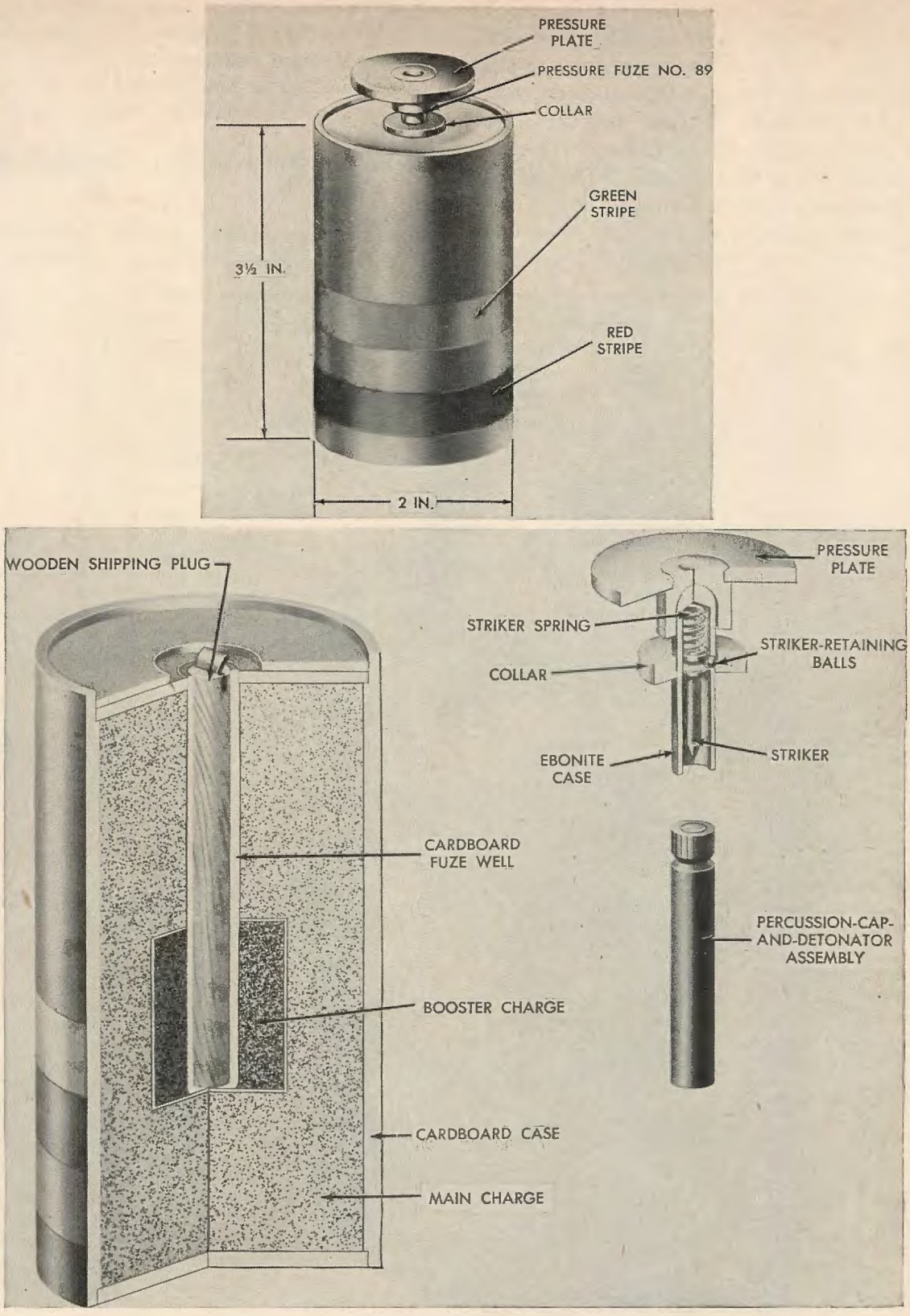


Figure 56. British antipersonnel mine No. 5, Mark I.

(1) Five mines are carried in a cardboard tube, and 6 tubes are packed in a wooden box. In a separate compartment at one end of the box are two sheet-metal cases one containing 30 fuzes and the other 30 percussion-cap-and-detonator assemblies. The total weight of the packed wooden box is 33 pounds.

(2) Four mines, complete with fuzes and percussion-cap-and-detonator assemblies, are packed in a container. Six containers are packed in a tin-plated liner, and two liners are packed in a wooden box. The total weight of the packed wooden box is 79 pounds.

43. British Antipersonnel Shrapnel Mine, Mark II

a. Description. The British antipersonnel shrapnel mine, Mark II (fig. 57) consists of a cast-

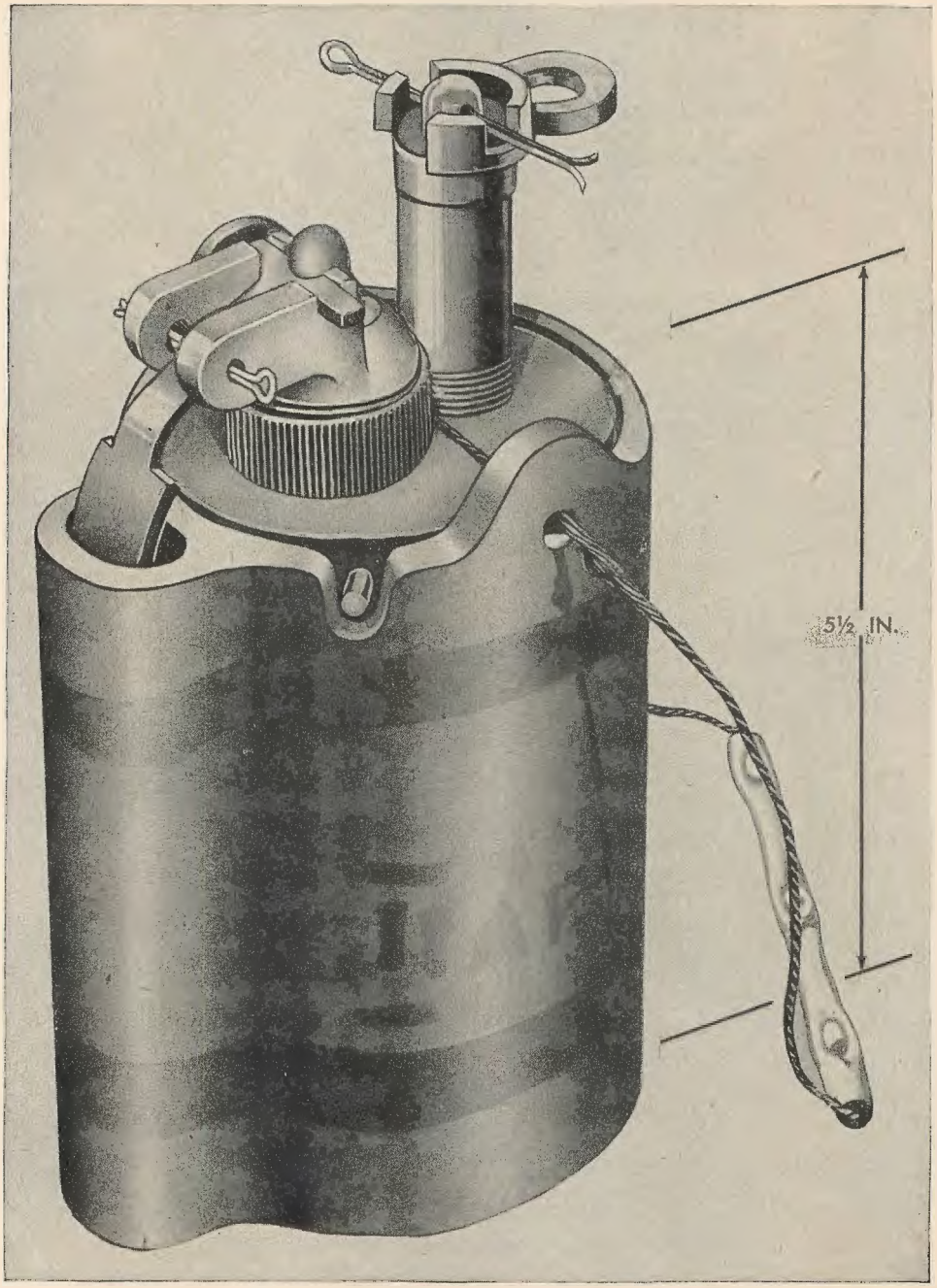


Figure 57. British antipersonnel shrapnel mine, Mark II.

iron case, 3½ inches in diameter and 5½ inches high, containing a steel-cased cylindrical projectile with a main charge of 1 pound of explosive. The projectile has two fuzes, each with a spring-loaded striker. The propelling fuze, with a trip-plate release, fires a blank cartridge which leads to a propelling chamber located in the bottom of the mine between the cast-iron case and the projectile. The projectile is fastened to the case by screws. The trip plate is held in place by a safety pin. The detonating fuze, with a lever release, fires a percussion-cap-and-detonator assembly. This assembly is located in the bottom of the fuze well where it is surrounded by the main charge. The lever that retains the striker of the detonating fuze extends down into a well on the side of the cast-iron case. This lever is held in place by a safety pin. The total weight of the mine is 10 pounds. It is painted yellow with two red stripes around the case, and is provided with a wire carry-

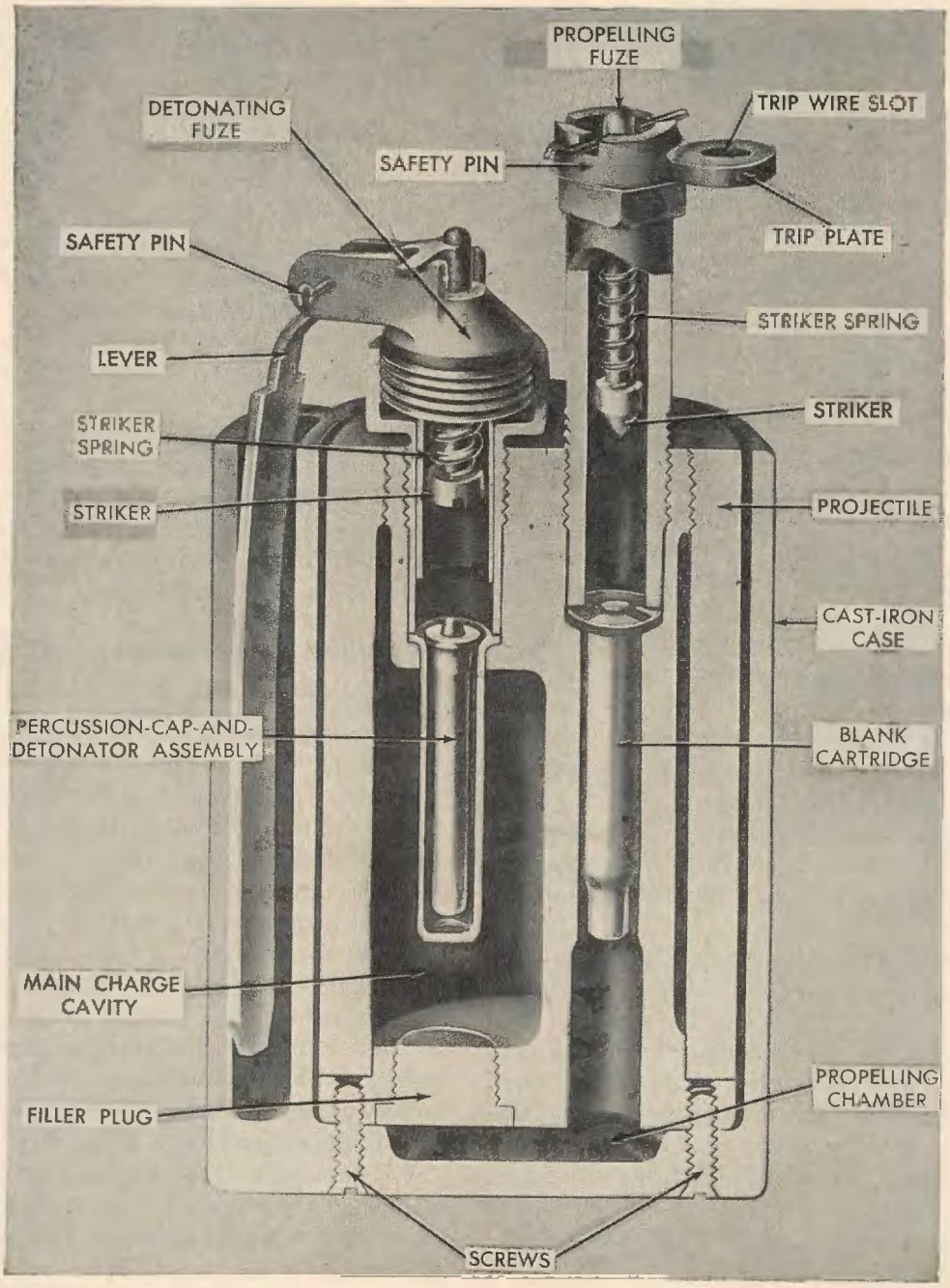


Figure 57—Continued.

ing handle. This mine has an effective causalty radius of 10 to 15 yards and is dangerous to personnel up to 50 yards.

b. Employment. This mine is used for unit security in antipersonnel mine fields. In antitank mine fields, it is used to hinder reconnaissance and breaching parties.

c. Functioning.

(1) A pull of at least 4 pounds on the trip wire attached to the trip-wire slot in the trip plate of the propelling fuze pulls out the trip plate, releasing the spring-loaded striker against the blank cartridge.

(2) The pressure created by the explosion of the blank cartridge breaks the screws holding the projectile to the cast-iron case and propels the projectile into the air.

(3) As the projectile is propelled upward, the lever that retains the striker of the detonating fuze clears the well on the side of the cast-iron case and springs outward. The spring-loaded striker is released against the percussion cap, firing the detonator and the main charge when the projectile is 3 feet above ground and causing fragmentation of the steel case.

d. Installing and Arming.

(1) Unscrew the propelling fuze with a spanner tool and see that the fuze well is clear.

(2) Insert the blank cartridge in the fuze well.

(3) Replace the propelling fuze, screwing it in tight. Be sure the safety pin is in place.

(4) Unscrew the detonating fuze and see that the detonator well is clear. Be sure the safety pin is in place.

(5) Insert the percussion-cap-and-detonator assembly so the end with the percussion cap rests on the shoulder of the detonator well.

(6) Replace the detonating fuze so the lever that retains the striker extends down into the well on the side of the cast-iron case.

(7) Place the mine in a hole so the trip plate of the propelling fuze is at ground level.

(8) Attach an anchored trip wire to the trip-wire slot in the trip plate.

(9) Remove the safety pins from both fuzes.

e. Neutralizing.

(1) Insert a safety pin or a nail in the safety-pin hole of each fuze.

(2) Cut the trip wire.

(3) Unscrew the propelling fuze and remove the blank cartridge from it.

(4) Make sure the safety pin of the detonating fuze is firmly in place and then unscrew the detonating fuze.

(5) Remove the percussion-cap-and-detonator assembly from the detonating fuze.

f. Packing. These mines, complete with propelling fuzes and detonating fuzes, are packed four in a wooden box with four blank cartridges, four percussion - cap - and - detonator assemblies, a wrench, and two coils of wire. The total weight of the packed wooden box is 54 pounds.

44. British Antipersonnel Shrapnel Mine, Mark I

The British antipersonnel shrapnel mine, Mark I, is an earlier model of the shrapnel mine, Mark II (par. 43). It is identical to the Mark II except for the following differences:

a. The lever on the detonating fuze in the Mark I is short and does not extend the full depth of the mine case.

b. The percussion-cap-and-detonator assembly in the Mark I has a delay pellet.

c. The mine case of the Mark I has "71A" stenciled on it in black.

d. The Mark I has a leather carrying strap instead of a wire handle.

45. British Antipersonnel Mine E. P. (Egyptian Pattern) No. 5

a. Description. The British antipersonnel mine E. P. No. 5 (fig. 58) consists of a cylindrical sheet-metal case, 2 inches in diameter and 3 inches high. Its total weight is 12 ounces, including a 5-ounce main charge and a 1.5-ounce booster charge. An off-center vertical well, housing a wooden pressure plunger, leads from the top of the case to a horizontal fuze well in the bottom of the case. The fuze consists of a glass ampoule of chemical which is inserted in the open end of a detonator and sealed in place with putty, clay, or cement. This mine is referred to as the chemical, pressure fuze E. P. No. 2 when used as the main fuze in the antitank mine E. P., Mark V (par. 38).

b. Employment. This mine is employed in antipersonnel mine fields. It is also used in antitank mine fields to hinder reconnaissance and breaching parties.

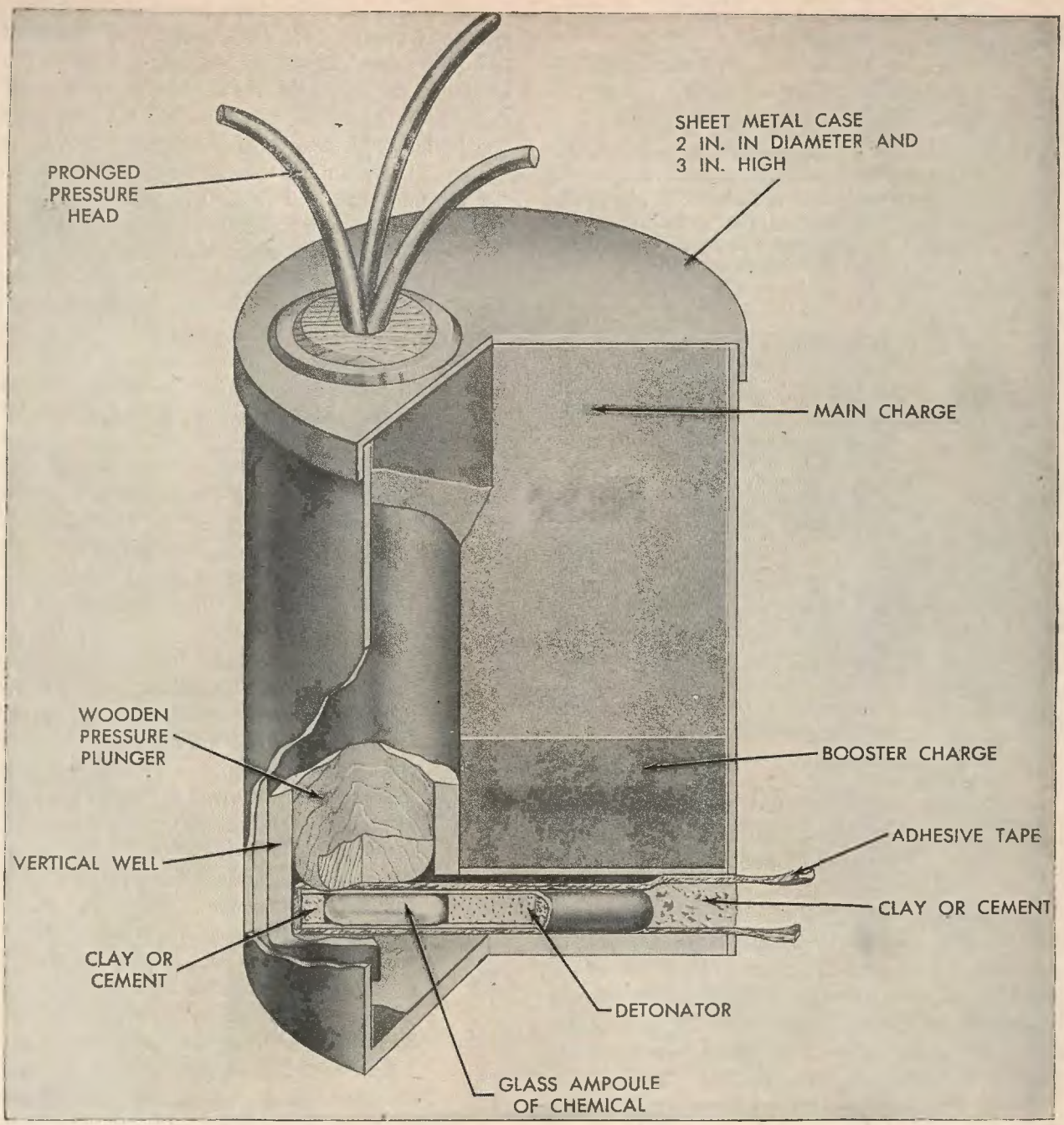


Figure 58. British antipersonnel mine E. P. No. 5.

c. Functioning. Pressure on the pronged pressure head depresses the wooden pressure plunger. The plunger crushes the glass ampoule of chemical, producing a flash. The flash sets off the detonator, firing the mine.

d. Installing and Arming.

(1) Insert the glass ampoule of chemical in the open end of the detonator and plug the open end of the detonator with putty, clay, or cement. Do not allow any of the putty, clay, or cement to project above the rim of the detonator.

(2) Wrap adhesive tape around the detonator as shown in figure 59. Insert the detonator, ampoule end first, in the horizontal fuze well.

(3) Fill the open end of the fuze well with putty, clay, cement, or a piece of cork.

(4) Place the mine in a hole so the top of the case is at ground level.
(5) Gently lower the wooden pressure plunger into the well in the top of the case until it rests on the detonator.

Note. When employing this mine as the chemical, pressure fuze E. P. No. 2 in the G. S. antitank mine E. P., Mark V, remove the pressure prongs from the wooden pressure plunger and insert a shear pin through the top of the plunger so it rests on the well, as shown in figure 59.

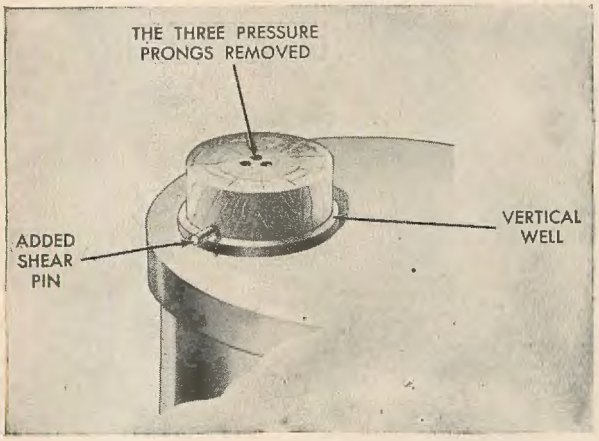


Figure 59. Antipersonnel mine E. P. No. 5 modified as the chemical, pressure fuze E. P. No. 2.

e. Neutralizing.
(1) Remove the wooden pressure plunger.
(2) Lift the mine and pull out the detonator by the tape ends projecting out of the fuze well.

f. Packing. These mines are packed 24 to a box with 24 wooden pressure plungers, a roll of tape, and a can of putty. The total weight of the packed box is 31 pounds. The glass ampoules of chemical are packed separately, 50 to a sheet-metal case and 20 cases to a wooden crate weighing a total of 14 pounds, when packed. The detonators are packed separately in normal service containers.

46. British Antipersonnel Ground Spike Mine

a. Description. The British antipersonnel ground spike mine (fig. 60) consists of a pencil-shaped steel case, ½ inch in diameter and 5¾ inches long, with a 1½-inch-diameter flange at the top and a sharp point at the bottom. It contains a spring-loaded sleeve that is retained by an umbrella catch. The catch is mounted on the upper end of an anchored spindle which passes through the spring and the sleeve. A striker with a hollow shaft fits over the upper end of the spindle, just above the catch. A .30-caliber ball cartridge fits into the upper end of the case with the bullet projecting out of the case above the flange. The mine has a total weight of 6 ounces.

b. Employment. This mine is placed in roads and pathways. The bullet will go through a man's foot or will severely damage a pneumatic tire.

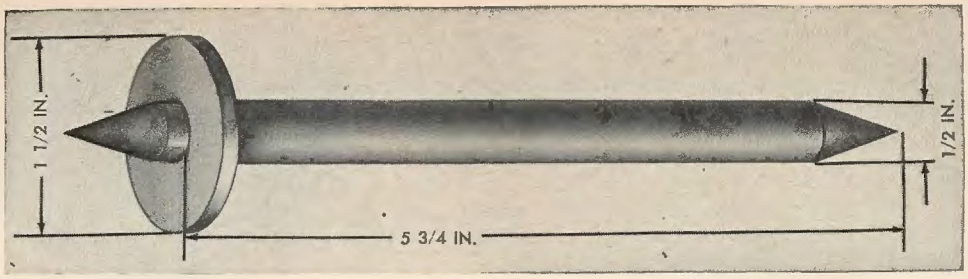
c. Functioning. A pressure of 4 pounds, or more, on the top of the bullet forces the cartridge down against the striker, forcing the hollow shaft of the striker over the umbrella catch. The released catch in turn releases the spring-loaded sleeve, which drives the striker against the cap of the cartridge, firing the cartridge.

d. Installing and Arming. This mine usually comes armed ready for use, the striker being kept in position in the case by a cork. If it is necessary to arm the mine, proceed as follows:
(1) Tip the mine to remove the striker.
(2) Push the mine into the ground to the level of the flange.
(3) Push the sleeve down into the case, compressing the spring, until the umbrella catch springs outward over the top of the sleeve. The catch holds the sleeve in the cocked position.
(4) Place the striker over the spindle.
(5) *At arm's length*, lower the cartridge gently into the fuze case until the rim of the cartridge rests on the striker. Hold the cartridge between the fingers so that, in case of a premature firing, a finger will not be blown off. Be careful not to exert any pressure on the cartridge; a pressure of as little as 4 pounds is enough to actuate the firing mechanism.

Caution: Never put a cartridge into the mine except when installing the mine.

e. Neutralizing. Carefully lift out the cartridge *at arm's length*, holding the cartridge between the fingers so that, in case of a premature firing, a finger will not be blown off.

f. Packing. Ten mines and 10 fuzes are wrapped in wax paper and packed in a flat sheet-metal case which is sealed with adhesive tape. Twenty cases are packed in a wooden box, 17½ inches long, 9 inches wide, and 8½ inches high. The total weight of the packed wooden box is 94 pounds.



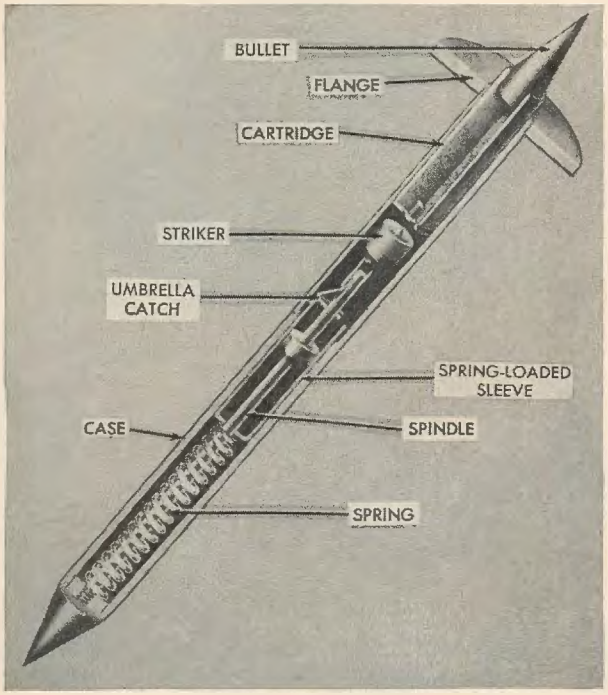


Figure 60. British antipersonnel ground spike mine.

47. British Antipersonnel Ointment-Box Mine

a. Description. The British antipersonnel ointment-box mine (fig. 61) consists of a cylindrical steel case made up of two sections. The top section fits into the bottom one. The bottom section contains a ring-shaped 3-ounce main charge. Centrally located in the top section is a well for screwing in the percussion cap. Below the percussion cap is a sleeve which contains a spring-loaded striker held in place by a copper shear wire. A cross-shaped detonator holder, with slots to clear the shear wire, fits over the sleeve containing the striker. The striker spring is not in compression, and the flash hole in the percussion-cap well is not in alinement with the flash hole in the detonator holder, until pressure is applied to the top section. The mine is 2 inches in diameter and 1⅛ inches high.

b. Employment. This mine is employed around unit positions, in ditches, and along roads and trails for its nuisance value. It is often found camouflaged as lumps of dirt, dung, or coal. This mine is effective against personnel, but only against the person who steps on it; it may burst the tire of a vehicle running over it.

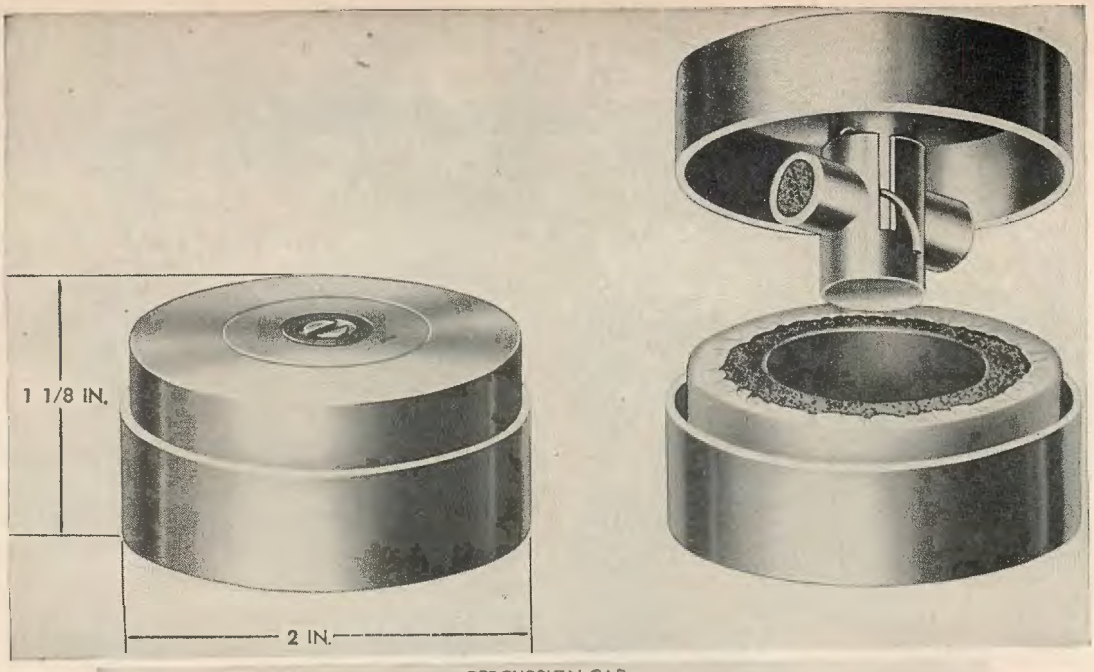
c. Functioning. Pressure on the top section forces the sleeve and the striker downward, compressing the striker spring, until the striker shaft rests on the bottom of the detonator holder. Continued pressure of 30 pounds, or more, shears the copper shear wire, forcing the sleeve to the bottom of the detonator holder. This action alines the flash hole in the percussion-cap well with the flash hole in the detonator holder and releases the spring-loaded striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Inspect the copper shear wire to make sure it is not wholly or partially sheared and that the striker is held securely to the sleeve.
(2) Screw in the percussion cap with a screw driver.
(3) Fit the detonator holder over the sleeve.
(4) Fit the top section into the bottom section.

e. Neutralizing.

(1) Separate the top section from the bottom section.
(2) Remove the detonator holder from the sleeve.
(3) Unscrew the percussion cap.



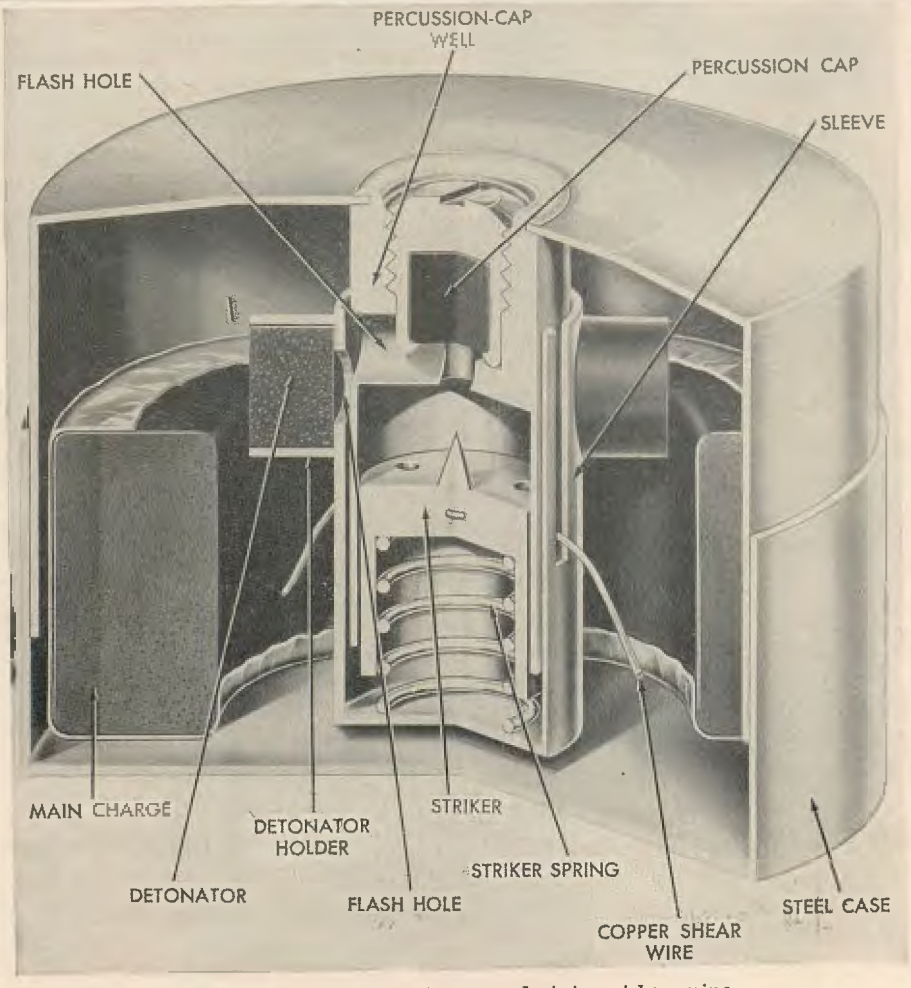


Figure 61. British antipersonnel ointment-box mine.

48. British Ball-Bearing Contact, Doorknob Booby Trap

a. Description. The British ball-bearing contact, doorknob booby trap (fig. 62) consists of an improvised electrical contact wired into a series circuit with a battery and an electric detonator, which is inserted in a charge. The contact is made up of a metal case, approximately ¾ inch in diameter and 3½ inches long, containing a ball contact, a cotter-pin type safety pin, a cork, and two nails which serve as terminals for the electric leads. One nail is driven through the cork, which is inserted in the open end of the case. The cork wedges the second nail against the case. The safety pin is inserted through the case between the ball bearing and the ends of the nails.

b. Employment. The ball-bearing contact is secured, by wire or tape, to an inside doorknob of a building that is likely to be occupied by troops of the opposing force.

c. Functioning. The ball-bearing contact is installed at an angle with the cork above the horizontal. When the doorknob turns, the contact tilts and the ball bearing rolls to the cork end of the case, touching the nail driven through the cork. Touching the nail completes the circuit between the battery and the electric detonator, firing the charge.

d. Installing and Arming.

(1) Assemble the ball-bearing contact and secure it to an inside doorknob as shown in figure 62.

(2) Before connecting the electric detonator

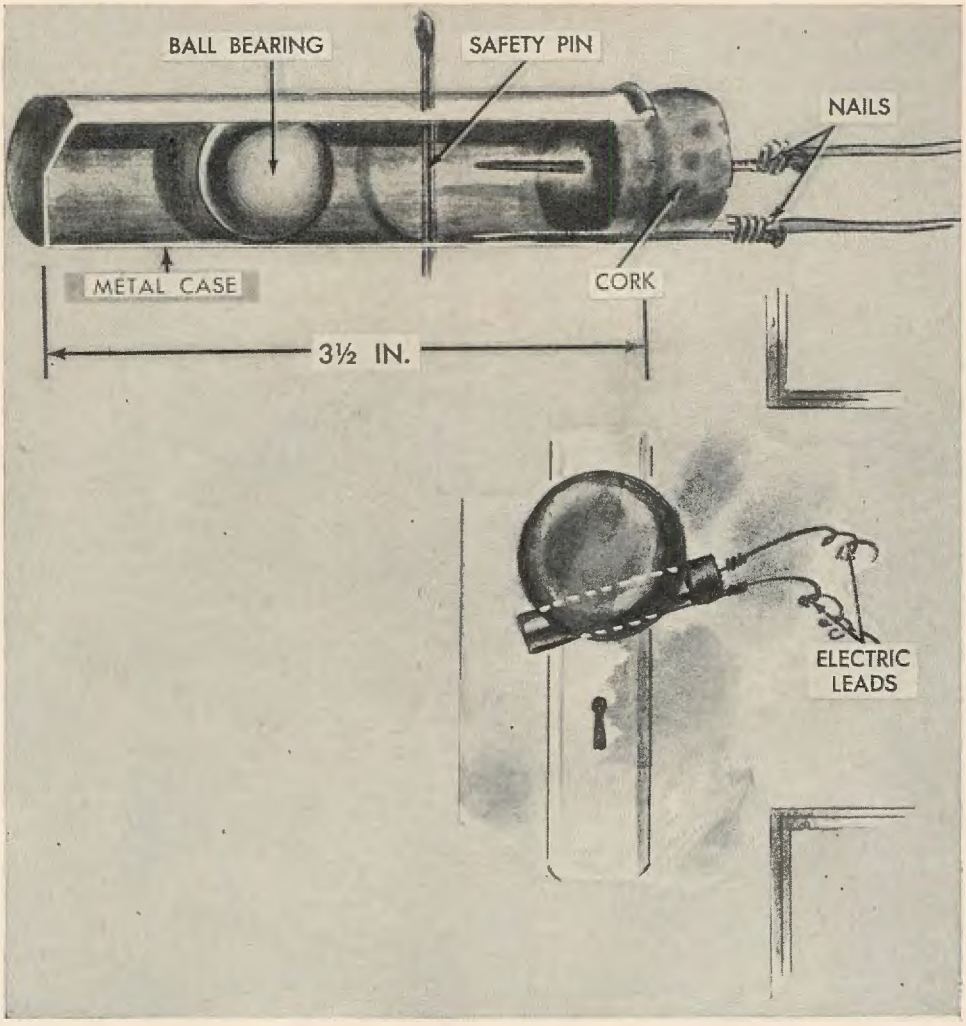


Figure 62. British ball-bearing contact, doorknob booby trap.

into the circuit, test the ball-bearing contact to see that the ball bearing rolls freely in the case and that the contact will carry the required current.

(3) Wire the ball-bearing contact in series with the battery and the electric detonator.

(4) Insert the detonator in a charge of explosive.

(5) Withdraw the safety pin.

e. Neutralizing. Inspect the entire circuit to make sure that cutting the wiring will not detonate another charge; then cut the electric leads *one at a time* and remove the electric detonator from the charge.

49. British Double-Drawer Booby Trap

a. Description. The British double-drawer booby trap (fig. 63) consists of an improvised electrical contact wired into a series circuit with a battery and an electric detonator. The detonator is inserted in a charge. The contact is made up of two metal plates installed behind a drawer in such a manner that they will come in contact with each other when the drawer is opened or closed. A cord connects the rear of the drawer to the rearmost plate. The battery, the electric detonator, and the charge are located in another drawer of the same piece of furniture.

b. Employment. To inflict the maximum number of casualties to command personnel, this booby trap is generally used in places where the opposing force will be expected to set up command posts or bivouacs.

c. Functioning. Opening or closing the drawer brings the plates into contact with each other. This completes the circuit between the battery and the electric detonator, firing the charge.

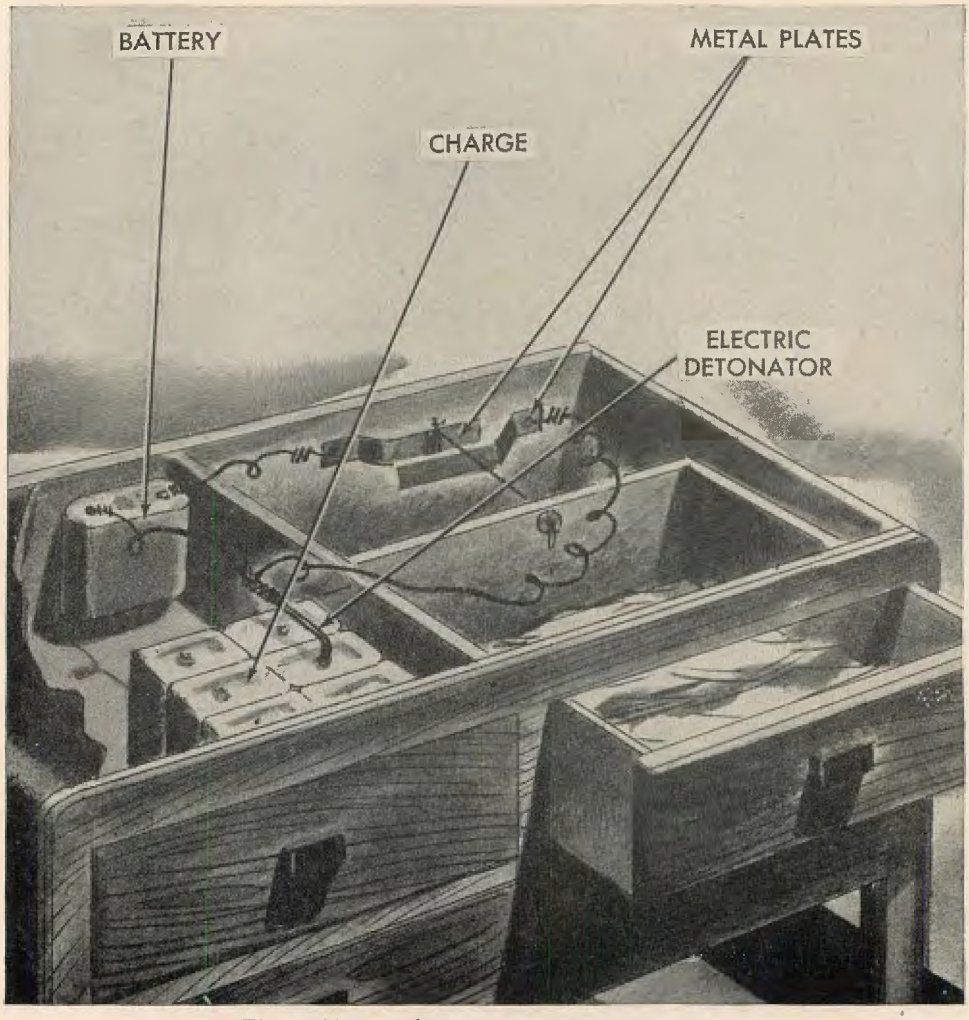


Figure 63. British double-drawer booby trap.

d. Installing and Arming.

(1) Install the two metal plates behind the drawer as shown in figure 63.

(2) Attach a cord or wire to the rearmost plate and to the rear of the drawer as shown in figure 63.

(3) Place the battery, the electric detonator, and the charge in another drawer and wire the two metal plates in series with the battery and the electric detonator. To prevent detection, nail this drawer shut.

e. Neutralizing. Cut the electric leads to the electric detonator and the battery and remove the detonator from the charge.

Caution: Cut only one lead at a time.

50. British Water-Barrel Delay Charge

a. Description. The British water-barrel delay charge (fig. 64) consists of an improvised electrochemical contact wired into a series circuit with a battery and an electric detonator. The detonator is inserted in a charge. Two insulated electric leads, from the battery and the detonator, pass upward through watertight joints in the bottom of a water barrel. The insulation is removed from the last few inches of the leads. The bare ends of the leads are tied to insulators screwed into the inside of the barrel. The bottom of the barrel, below the insulators, is filled with a copper sulfate solution. The battery, the electric detonator, and the charge are buried in the ground or are concealed in a nearby building.

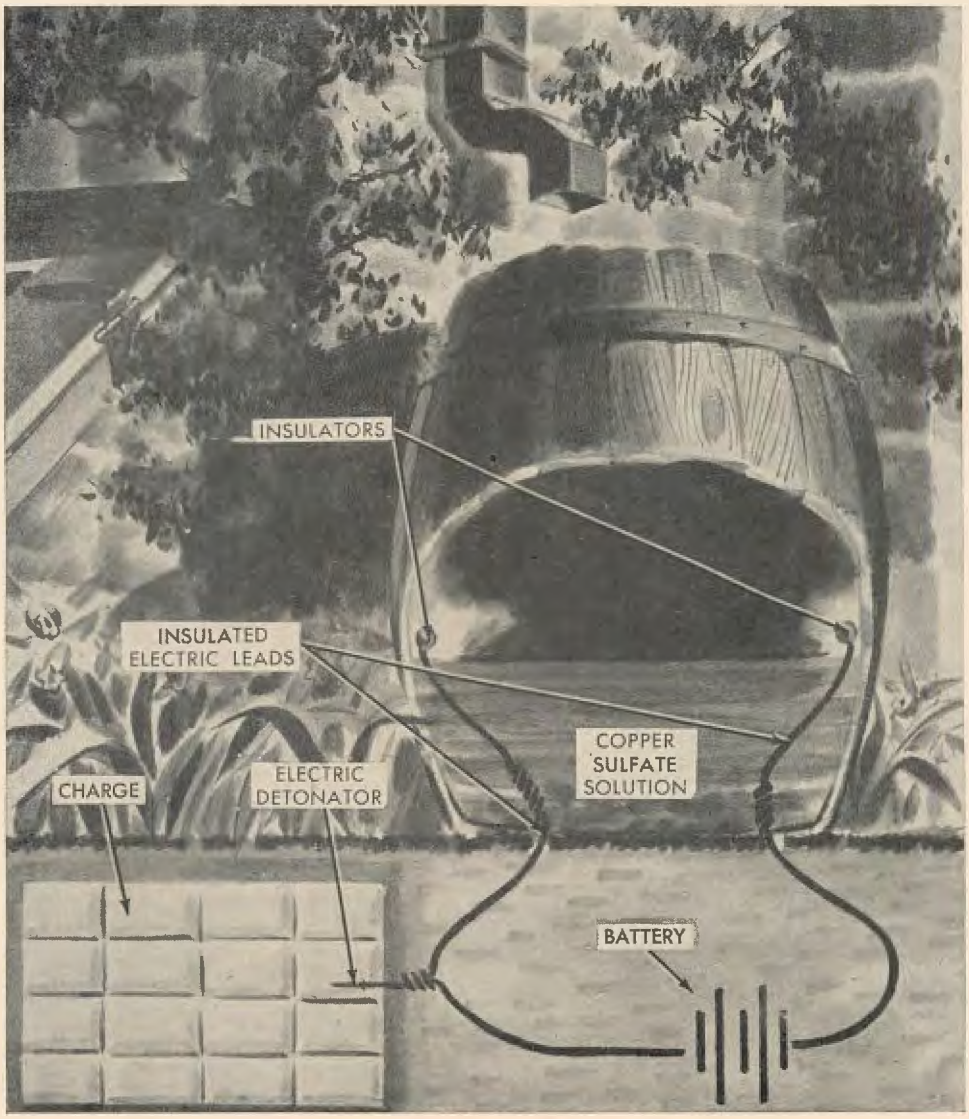


Figure 64. British water-barrel delay charge.

b. Employment. This booby trap is employed in areas where troops of the opposing force are expected to congregate. The water barrel is placed under a drainpipe or at other site where water drips into the barrel.

c. Functioning. As the barrel fills with water, the copper sulfate solution rises until the bare ends of the electric leads are submerged. This completes the circuit, through the solution, between the battery and the electric detonator, firing the charge.

d. Installing and Arming.

(1) Install the two insulators and the two watertight joints in the barrel as shown in figure 64.

(2) Pass an electric lead upward through each of the watertight joints.

(3) Remove the insulation from the last few inches of the leads, and tie the bare ends to the insulators.

(4) Either bury the battery, the electric detonator, and the charge in the ground or conceal them in a nearby building.

(5) Connect one of the leads from the barrel to the battery, and the other one to the detonator.

(6) Complete the wiring by connecting the other battery terminal to the detonator.

(7) Fill the bottom of the barrel, below the insulators, with the copper sulfate solution. Vary the distance between the solution and the insulators according to the desired delay before the charge is fired.

Note. The blue color of the copper sulfate solution might arouse suspicion; place some straw or similar material on the surface of the solution.

e. Neutralizing.

(1) Drill a hole near the bottom of the barrel to drain it of the copper sulfate solution.

(2) Make sure there are no antilifting devices or activating fuzes under the barrel.

(3) Cut one of the leads and pull it out of the barrel from below; then cut the other lead and pull it out of the barrel, being very careful that no electrical contact is made.

(4) Very carefully trace the leads to the battery and the charge, and cut the leads, *one at a time*, at the battery and the detonator.

(5) Remove the electric detonator from the charge.

Chapter 7

MINE DETECTORS

51. British Mine Prodder No. 4

The mine prodder No. 4 (fig. 65) is the standard British mine probe. The probe consists of a pistol-grip handle, two light-metal tubular sections, and a probe-tip section. The probe tip is made of stainless steel. The complete probe, when assembled, is about 5 feet 3 inches in length and weighs approximately 2 pounds. When the operator is probing in the kneeling or prone position, he removes one of the tubular sections of the probe. When the mine probe is not in use, the entire assembly is disassembled and placed in a canvas carrying bag, which is attached to the left shoulder strap of a soldier's field webbing equipment. The probe-tip section is carried with the probe tip screwed inside one of the tubular sections.

52. British Electronic Mine Detectors

The British Army produced 11 standard portable electronic metallic-mine detectors during World War II. The first to be developed contain the word "Polish" in their nomenclature because of their invention by 2 Polish officers. The British mine detectors discussed in the following paragraphs are either of the inductive-bridge or regenerative type. Of the 11 standard portable mine detectors (table III) in use in the British Army, the mine detector No. 4A (par. 54) is the most widely used.

a. Inductive Bridge. The inductive-bridge type of mine detector utilizes the principle that a metallic object will cause a distortion of the primary magnetic field which is present about a coil system containing an alternating current. The distortion is caused by eddy currents set up in the metallic object if the object contains nonferrous metals; or by the concentration of the magnetic field if the metallic object contains a ferrous metal. The circuit of this type of mine detector contains an oscillator (the source of the alternating current), a coil system (search coils), and an amplifier. The coil system, which comprises the inductive bridge, is balanced as accurately as possible so that little or no unbalance is present in the inductive-bridge system. When this condition is attained, very little sound will be produced by the amplifier. When the coil system comes within range of a metallic object, the inductive bridge is unbalanced and a characteristic sound will be emitted by the amplifier.

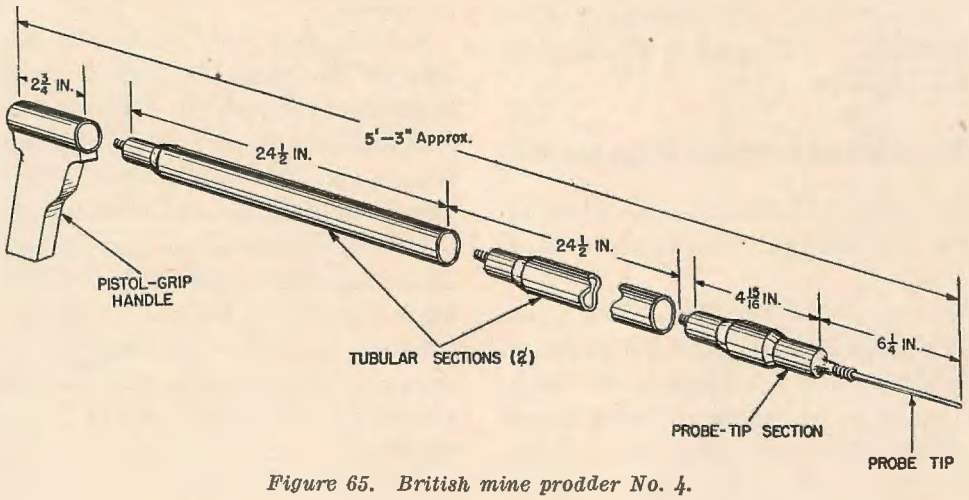


Figure 65. British mine prodder No. 4.

Table III. Characteristics of British Mine Detectors

Characteristics	No. 1 (Polish)	No. 2 (Polish)	No. 3 (Polish)	No. 3A	No. 4	No. 4A	No. 4B	No. 5	No. 5A	No. 6	No. 6A	No. X7
1. Weight (pounds):												
Amplifier and carrying bag	15. 50	15. 50	18. 00	18. 00	17. 25	17. 25	17. 25	[a] 42. 00	[a] 42. 00	9. 25	8. 75	44. 75
Large search head	12. 75	12. 75	14. 00	14. 00	6. 25	6. 25	6. 25	24. 00	24. 00	5. 75	1. 25	17. 00
Small search head	4. 00	4. 00	4. 50	4. 50	------	------	------	------	------	------	------	------
2. Operational weight:												
w/large search head	28. 25	28. 25	32. 00	32. 00	24. 00	24. 00	24. 00	66. 00	66. 00	15. 00	13. 00	63. 75
w/small search head	19. 50	19. 50	22. 50	22. 50	------	------	------	------	------	------	------	------
3. Range of detection with large search head (inches):												
Tellermine[b]	24–28	24–28	26–30	24	22–25	22–25	22–25	22–24	24	20	21	[c] 44
S-mine[b]	13–15	13–15	14–16	18	15–17	15–17	15–17	13–15	14	13	13	[c] 31
In magnetite and magnetite-rich soil (maximum)	([d])	([d])	([d])	9	27	27	27	([d])	27	([d])	23	([e])
4. Range of detection with small search head (inches):												
Tellermine[b]	18–20	18–20	19–21	16	------	------	------	------	------	------	------	------
S-mine[b]	11–13	11–13	12–14	18	------	------	------	------	------	------	------	------
5. Battery life at normal temperatures (hours)	------	------	------	------	60–100	60–100	60–100	------	------	------	------	------

[a] Includes carrying frame and harness.
[b] See TM 5-223C.
[c] At 30 yards from the loop.
[d] Will not discriminate.
[e] Not known.

b. Regenerative. The regenerative type of mine detector indicates the presence of a secondary magnetic field, in contrast to the inductive-bridge type of mine detector which indicates the distortion of a primary magnetic field. The secondary magnetic field is built up by a metallic object under the influence of a primary magnetic field. By using a coil system for the search coils, the mutual inductance of the coils can be reduced to a very low value. If a low- or medium-frequency oscillator is connected to the input of a coil system, the oscillator will tend to oscillate at a different frequency when a metallic object is introduced into the primary magnetic field. This change in frequency of the oscillator will result in a change of sound from the amplifier.

53. British Mine Detectors Other Than No. 4A

A brief description of the British mine detectors other than the No. 4A (par. 54) is given in *a* through *l* below.

a. Mine Detector No. 1 (Polish). The mine detector No. 1 was the first standard British mine detector designed for use by troops in the field. A very small quantity of this mine detector was produced in 1941. The mine detector is of the inductive-bridge type and consists of two flat circular coils mounted on parallel planes and so arranged as to overlap each other partially. The two flat circular coils inclosed in a plastic case compose the large search-head unit. A 6-foot bamboo pole is attached to the large search-head unit for use by an operator in the standing position. A small search-head unit on a shorter pole is provided for use by an operator in the prone or crawling position. The oscillator, the amplifier, and the batteries are contained in a carrying bag carried on the operator's back. Detection is indicated by means of a headset; no visual indicator is provided.

b. Mine Detector No. 2 (Polish). The mine detector No. 2 (figs. 66 and 67) is almost identical to the mine detector No. 1, except for a few minor modifications to permit simplification of manufacture and a few minor mechanical changes that were found to be desirable from the results of the field tests conducted on the mine detector No. 1. The mine detector No. 2 with the large search-head (fig. 66) is for use by an operator in the standing position. The detector equipped with the small search-head unit and shorter handle is for use by an operator in the kneeling or prone position.

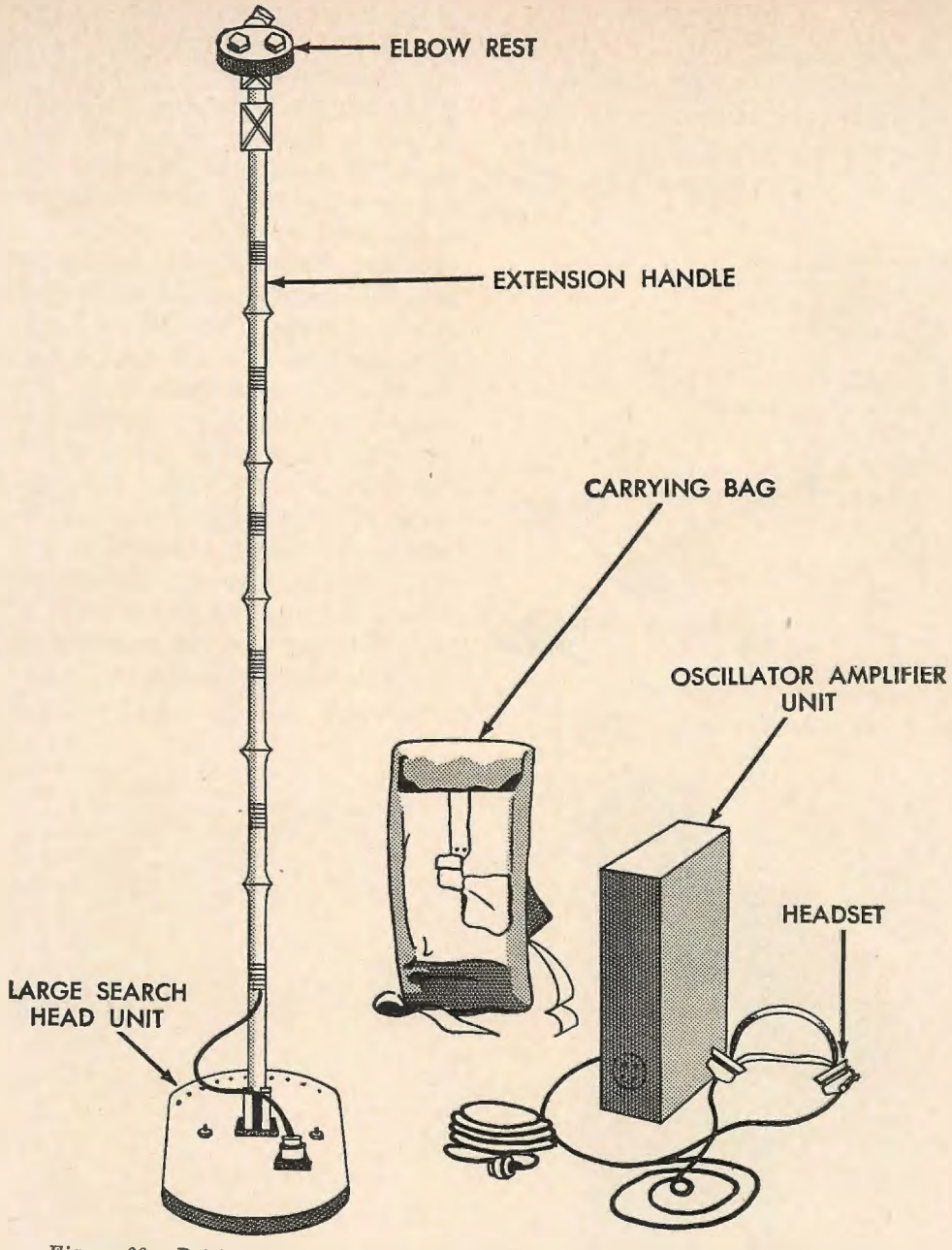


Figure 66. British mine detector No. 2 (Polish), with large search-head unit.

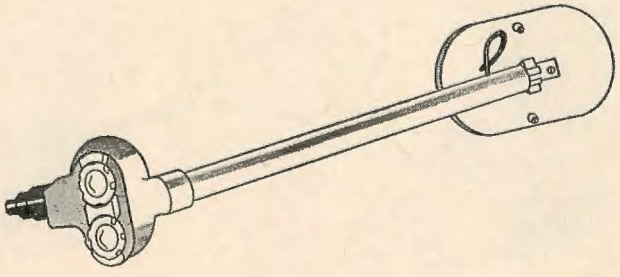


Figure 67. Small search-head unit for the British mine detector No. 2 (Polish).

c. Mine Detector No. 3 (Polish). The mine detector No. 3 (fig. 68) retains the inductive-bridge type of operation used in mine detectors Nos. 1 and 2 but contains several improvements. The original bamboo pole was discarded in favor of a two-section pole of split-cane and steel. The amplifier unit and the control box were redesigned electrically and mechanically.

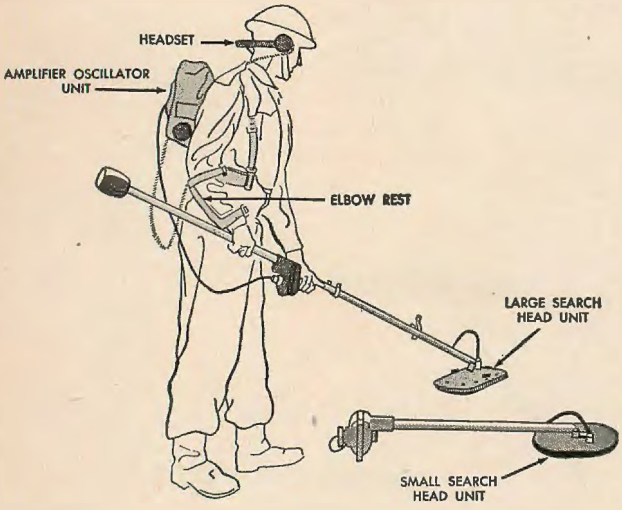


Figure 68. British mine detector No. 3 (Polish).

d. Mine Detector No. 3A. The mine detector No. 3A is actually the mine detector No. 3 modified to permit detection of metallic mines buried in magnetite or magnetite-rich soils. To accomplish this detection, the inductive-bridge type was discarded in favor of the regenerative type of mine detector. Except for the modifications to the electrical circuit, other construction features are the same as for the mine detector No. 3. While the redesign of the mine detector No. 3A was in progress the new mine detector No. 4 was designed and proved to be superior, so that very few models of the No. 3A were ever produced.

e. Mine Detector No. 4. The mine detector No. 4 (fig. 69) was designed to provide an instrument which was lighter, waterproof, and less bulky. The earlier mine detectors did not have these properties. At the time this detector was being designed, research on the regenerative circuit indicated that this type of mine detector had many advantages over the inductive-bridge type detec-

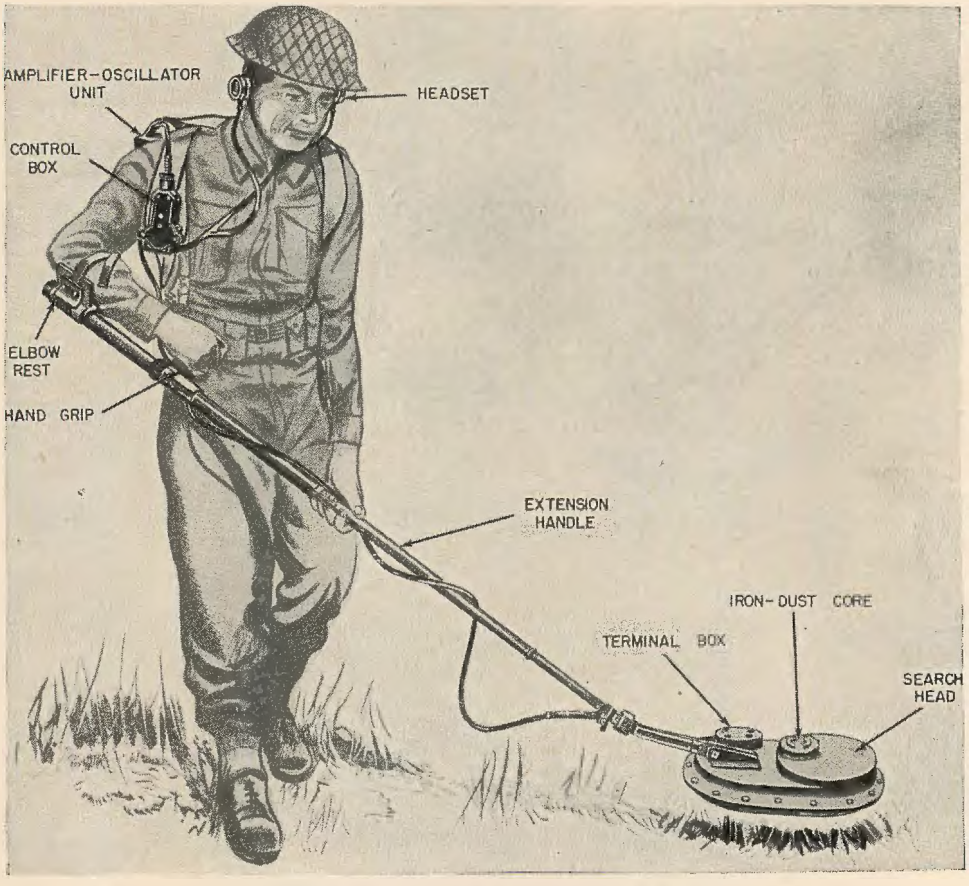


Figure 69. British mine detector No. 4.

tor. The regenerative circuit was therefore decided upon and used in this mine detector. The mine detector No. 4A (par. 54) is similar to this detector.

f. Mine Detector No. 4B. The mine detector No. 4B is a modification of the mine detector No. 4. The modification is designed to counteract the frequency-induction fuze (TM 5-223A and TM 5–223C) which will detonate when an ordinary mine detector is operated over the fuze. The mine detector No. 4B has a copper-oxide rectifier with a high resistance at a very low voltage. The resistance decreases rapidly with increased voltage. The rectifier is connected across the output coil of the mine detector, introducing a selective short circuit which functions in proportion to the voltage applied. This mine detector tends to limit the amplitude of oscillation to a low value no matter how close the detector may be brought to a mine. Even with amplitude of oscillation of a low value, mines can still be detected.

g. Mine Detector No. 5. The mine detector No. 5 (fig. 70) was designed to cover a path 6 feet wide, to facilitate the clearing of road shoulders and footpaths. This mine detector is of the inductive-bridge type with eight search coils in two sets of four coils each. The search coils are mounted in a long, rectangular search head. The search head is mounted on a metal frame supported by the operator's shoulders. The heavy search head on the front of the metal frame is counterbalanced by the oscillator-amplifier unit mounted on the rear of the frame.

h. Mine Detector No. 5A. The mine detector No. 5A is identical to the mine detector No. 5 except that the regenerative principle is used in order that the mine detector will not detonate the frequency-induction type fuze (TM 5–223A and TM 5–223C).

i. Mine Detector No. 6. The mine detector No. 6 (fig. 71) is an inductive-bridge type and was built to fulfill the requirements of beach reconnaissance parties for a lightweight, waterproof mine detector. Production of this detector was stopped when the mine detector No. 4 was produced in quantity.

j. Mine Detector No. 6A. The mine detector No. 6A (fig. 72) is of the regenerative type and incorporates some of the best features of the mine detectors Nos. 4A and 6. Its main disadvantage is the short life of the battery, approximately 16 hours. This disadvantage, with its resulting

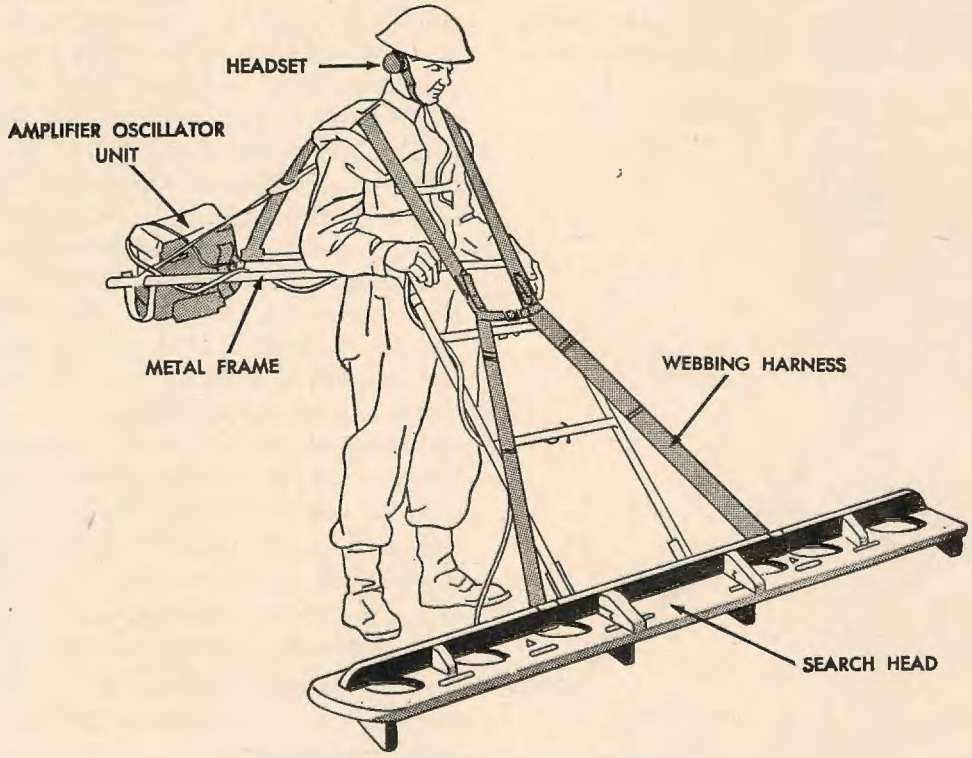


Figure 70. British mine detector No. 5.

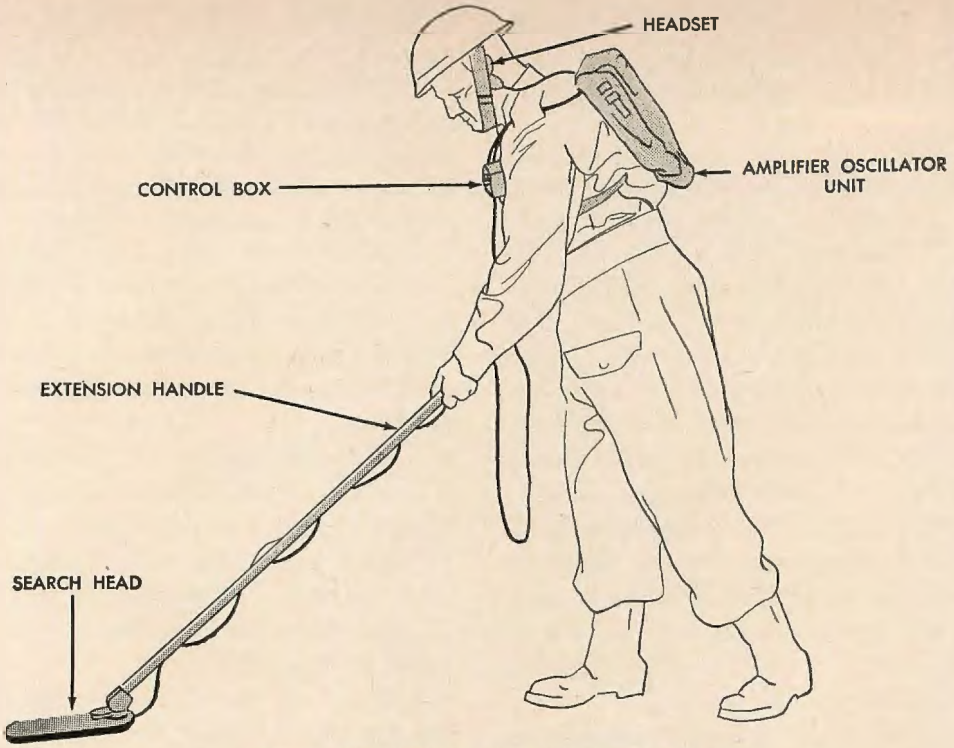


Figure 71. British mine detector No. 6.

supply problem, is the main reason why the mine detector No. 6A has not become the general purpose mine detector of the British Army.

k. Mine Detector No. X7. The mine detector No. X7 (fig. 73) was developed to detect deeply buried mines. It closely resembles the mine detector No. 5 in appearance. An electromagnetic field of large area is created in the earth by laying a heavy cable in the form of a rectangular loop and passing an alternating current of 50 amperes and 500 cycles per second through the cable. The electrical current is furnished by an engine-driven generator. Any metallic object present in the electromagnetic field, surrounding the rectangular loop of heavy cable, will distort the field in the immediate vicinity of the object. This distortion may then be picked up by the search unit. The device functions fundamentally as an inductive-bridge type detector and is capable of clearing large areas as indicated in figure 73.

Figure 72. British mine detector No. 6A.

l. Mine Locator. The mine locator (fig. 74) was designed to detect beach mines which are often deeply buried under shifting sand. The device may also be used to detect unexploded bombs. The mine locator is so designed as to be in balance with the earth's magnetic field. If a ferro-magnetic body is present in the earth's magnetic field it will cause the lines of force of the field to increase in density, unbalancing the mine locator. This unbalance causes the deflection of a needle on a visual indicator. The mine locator is an extremely delicate device not suitable for general issue to combat troops.

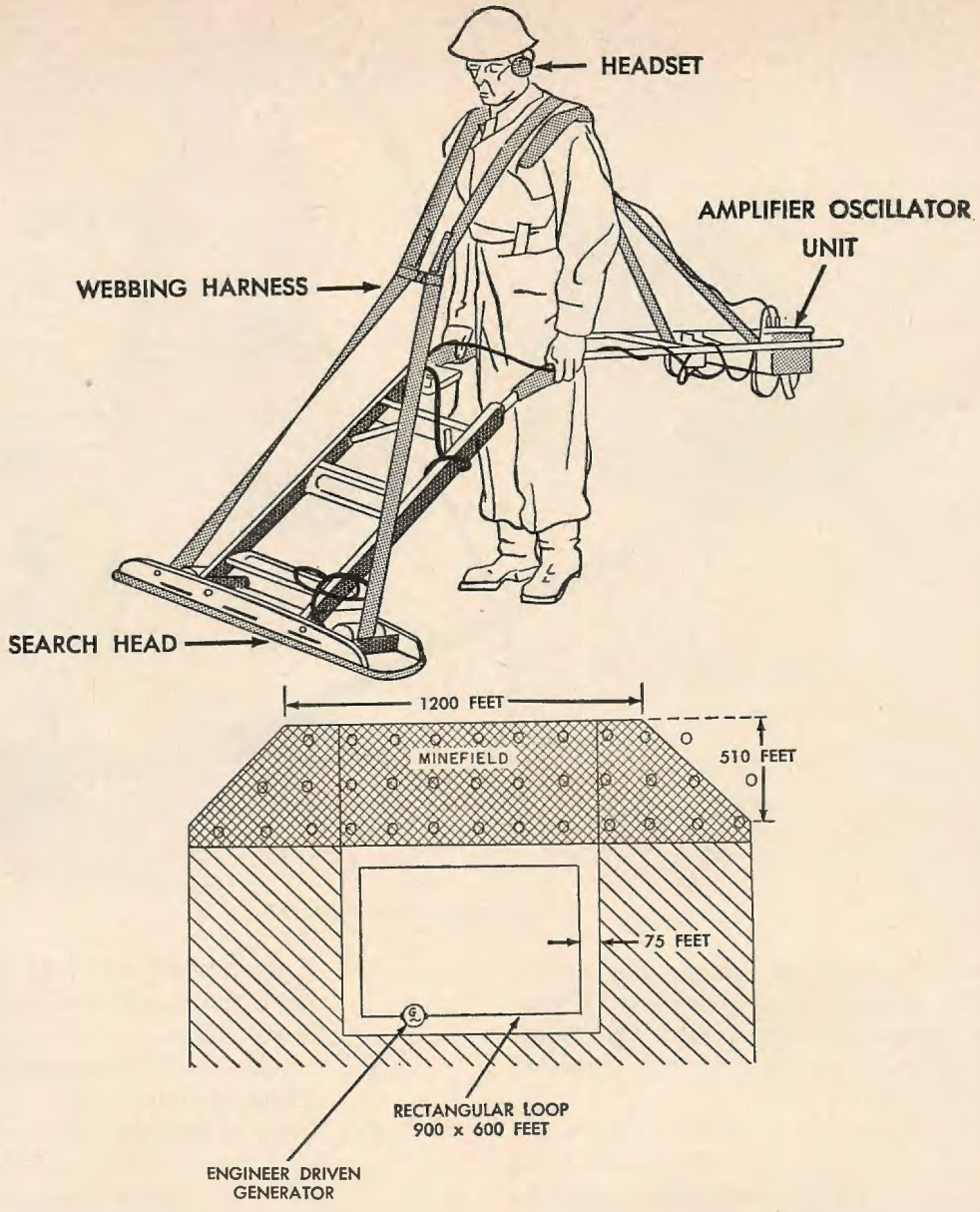


Figure 73. British mine detector No. X7 and plan view of typical employment of rectangular loop for mine field clearing.

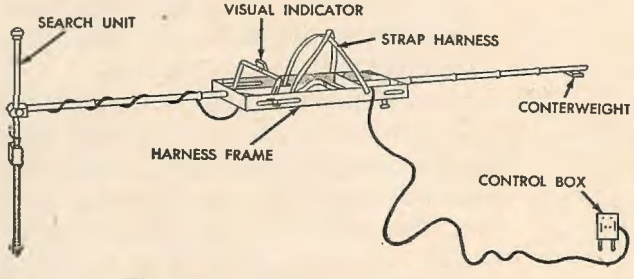


Figure 74. British mine locator.

54. British Mine Detector No. 4A

The British mine detector No. 4A (fig. 75) is a regenerative type (par. 52*b*) metallic detector. Except for the design of the control box, this detector is identical to the mine detector No. 4. This detector was developed to simplify the operation of the mine detector No. 4 which required frequent delicate adjustments of the iron-dust core in the search-head. By means of a switch on the control box the feedback from the search-head through the control box is partially capacitive in contrast with the feedback in the mine detector No. 4 which is entirely resistive. The phase shift resulting from the addition of a capacitance in the system will be approximately equivalent to the PAVE setting of the iron-dust core of the mine detector No. 4.

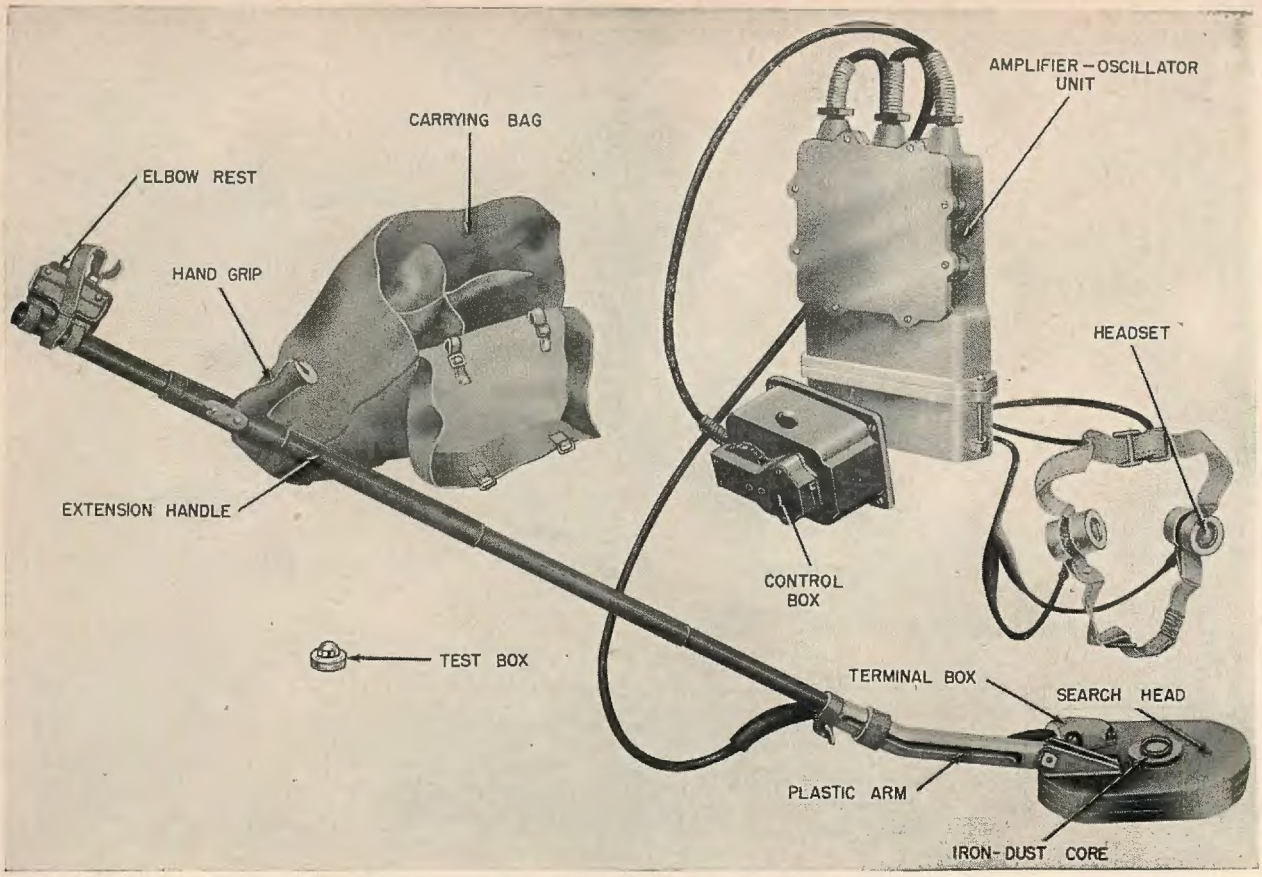


Figure 75. British mine detector No. 4A.

a. Outstanding Features. The outstanding features of the mine detector 4A are as follows:

(1) All components are completely waterproof and the detector will function under 5 feet of water.

(2) Various parts of the detector were designed to reduce the weight and bulk, making the equipment much easier to transport.

(3) An audible signal in the headset occurs only when a metallic object is located. A steady hum in the headset, which had been very fatiguing to the operator in earlier models, was eliminated.

(4) This detector may be operated to locate mines buried in magnetite or magnetite-rich soils.

b. Main Components.

(1) *Search head.* The search head consists of two pancake coils which are sealed in a flat, oval, molded plastic case (fig. 75). The following items are mounted on top of the search head:

(*a*) A waterproof terminal box through which the search-head cable passes to the amplifier.

(*b*) A rotating iron-dust core for reduction of mutual inductance.

(*c*) A swivel joint for the extension handle. A 10-inch plastic arm is connected to the swivel joint by means of a plastic bolt. The plastic arm fits onto the extension handle. It is also used as the handle when the detector is used by an operator in the prone position.

(2) *Extension handle.* The extension handle is in four telescopic steel sections. One end fits into the plastic arm of the search head and is clamped in position by a wing nut. Near the other end of the extension handle is a hand grip which is hinged to lie along the extension handle when it is not in use. A locking device is provided to hold the hand grip in position when it is in use. At the very end of the extension handle there is a padded elbow

rest which opens to receive the operator's elbow and a strap which holds the handle firmly to the operator's forearm. The extension handle is 51 inches long in the extended position which gives an arc of sweep of approximately 7½ feet. The handle weighs 2.25 pounds and is 15 inches long when it is collapsed.

(3) *Amplifier-oscillator unit.*

(*a*) The amplifier-oscillator unit consists of an aluminum case containing the tubes and apparatus for converting the impulses from the search head into sound. It also houses a combined high-tension/low-tension battery. The four-core search-head cable which connects the amplifier to the search coils passes through a watertight fitting as do the headset and the control-box cables.

(*b*) Connection within the casing between the amplifier unit and the battery is made by a four-pin plug which fits a socket on the battery. The battery can be changed by unscrewing the bolts on the lower casing. These bolts must be kept oily to avoid rust. The casing is watertight. If the casing is opened to test the tubes or batteries, it must be screwed up again firmly and evenly; otherwise, the joint will not be watertight. Test plugs are provided to apply pressure to the closed amplifier-oscillator casing to test it for leaks.

(4) *Control box.* The control box (fig. 76) is made of cast aluminum and is 5 inches long, 3 inches wide, and 2½ inches high. It is clipped on the shoulder strap of the operator's webbing carrying bag. A rubber test button is located in the side of the control box and is used for a quick check of the mine detector for satisfactory operation. A cable from the amplifier-oscillator unit enters the control box through a waterproof fitting. The control box is fitted with a cover to protect the two controls, the regenerative control, and the OFF-NORMAL-PAVE switch.

(*a*) *Regenerative control.* This control, marked REGEN on the cover, is used to adjust the mine detector to the most sensitive condition for detecting mines. The control consists of a potentiometer by which the resistive feedback is controlled. Reactive feedback is controlled by adjustment of the iron-dust core in the search head.

(*b*) *OFF-NORMAL-PAVE switch.* In the NORMAL position, this switch provides current for mine detection under normal conditions. In the PAVE position, the mine detector is set to detect metallic mines buried in magnetite or magnetite-rich soils.

(5) *Test box.* The test box is provided as a means of checking the sensitivity and phase setting of the mine detector. The test box consists of a plastic circular cas-

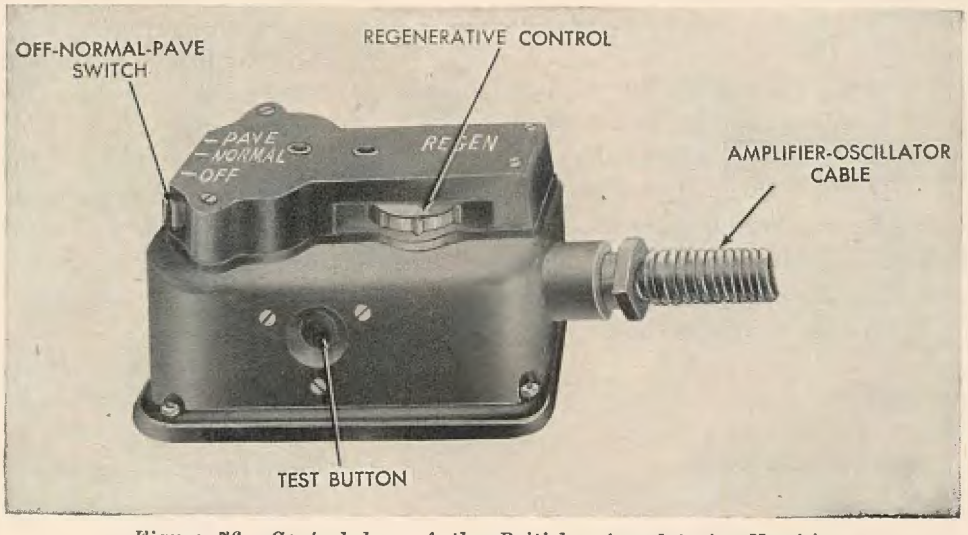


Figure 76. Control box of the British mine detector No. 4A.

ing, 4 inches in diameter and 4 inches high. The plastic casing contains a laminated iron core with a few turns of heavy wire around it. On top of the plastic casing is a switch with the positions of "+", "0", and "−" marked on it. In the "+" position, the circuit to the laminated iron core is open and the core has the effect of a small metallic body. In the "−" position of the switch the circuit to the laminated iron core is closed and the core acts as a large metallic body. In the "0" position a resistor of 85.5 ohms is introduced in series with the laminated iron core, resulting in the effect of an increased coupling between the input and output of the amplifier-oscillator without affecting the frequency. These three positions are used to test the detector as indicated in *e* (3) below. A wooden ruler is also provided for use with the test box in determining the correct distance from the search head for testing.

(6) *Carrying bag.* A canvas carrying bag which will contain the complete mine detector is provided with the equipment. The carrying bag is strapped over the operator's shoulders and is fastened by a belt around the operator's waist. When the mine detector is in use, only the amplifier-oscillator and the battery are carried in the carrying bag. The carrying bag measures 15 by 10 by 7 inches.

(7) *Headset.* The headset is completely inclosed in rubber and is connected to the screen circuit of the last stage of the amplifier.

(8) *Shipping case.* The shipping case is made of wood and holds the complete mine detector during shipment. The total weight of the shipping case and the mine detector (including spare parts) is 54 pounds. Dimensions of the shipping case are 24 by 14 by 11 inches. The following spares are carried in the shipping case:

2 tubes
2 batteries
1 iron-dust-core cover

c. Principle of Operation. This detector functions on the regenerative principle (par. 52*b*).

(1) When the mine detector is manufactured, the two search coils are permanently mounted within the search head so as to permit little or no transfer of electrical energy. When the mine detector is in operation, a metallic object within the electromagnetic field will cause an upset in the balance of the two search coils, resulting in a flow of energy from one coil to another. This flow of energy is directed through the amplifier-oscillator where it is relayed to the headset.

(2) When the iron-dust core in the search head is turned in a clockwise direction it is brought closer to the search coils; when turned in a counterclockwise direction, the core is moved farther away from the search coils. This adjustment is made possible by the right-hand threads present on the outside of the iron-dust core. This adjustment is used to set an initial unbalance between the search coils to offset the effects on the detector by magnetite and magnetite-rich soils, changes in temperature, or a slight unbalance in manufacture.

d. Assembling Instructions.

(1) *For sweeping in the standing position.*

(*a*) Remove the equipment from the shipping case. Examine the various components for any evidence of damage or mishandling.

(*b*) Replace the amplifier-oscillator unit in the carrying bag.

(*c*) Put on the carrying bag and headset; secure the carrying bag around the waist by means of the webbing belt.

(*d*) Fasten the control box to the webbing shoulder strap.

(*e*) Extend the extension handle fully.

(*f*) Open the plastic arm on the search head. Take up the slack on the search-head cable and secure the cable to the plastic arm by means of the webbing loop provided.

(*g*) Fit the end of the extension handle into the plastic arm on the search head and tighten the wing nut.

(*h*) Open the hand grip and lock it in place. Open the snaps on the padded elbow rest and the strap.

(*i*) Hold the extension handle as for searching and adjust the position of the search head so it is parallel with the ground; clamp the search head in position with the locking nuts.

(*j*) Coil the search-head cable around the extension handle in three complete turns. Take up the slack in the cable and, using the snaps, fasten the excess cable in the web band on the end of the extension pole.

(*k*) Put an arm through the arm-rest strap and buckle the strap.

(2) *For sweeping in the prone position.*

(*a*) Remove the equipment from the shipping case. Examine the various components for any evidence of damage or mishandling.

(*b*) Replace the amplifier-oscillator unit and the extension handle in the carrying bag. Whenever the extension handle is collapsed or returned to the carrying bag, wipe it with the oily cloth kept in the shipping case. Be sure the extension handle is placed securely in the carrying bag since it is easily lost when the operator is in the prone position.

(*c*) Put on the carrying bag and headset; secure the carrying bag around the waist by means of the webbing belt.

(*d*) Fasten the control box to the webbing shoulder strap.

(*e*) In the prone position, open the plastic arm and lock it, by means of the locking nuts, in a position so the search head is parallel to the ground.

(*f*) Allow sufficient search-head cable for use of the detector at arm's length; place the surplus cable in the carrying bag and fasten the flap.

e. Operating Instructions.

(1) Switch the control box switch to the NORMAL or PAVE position, depending on the type of soil to be swept.

(2) Hold the search head well clear of the ground and at least 4 feet from any metallic objects. Turn the REGEN control fully counterclockwise and then clockwise until an audible note is heard. Then turn the control counterclockwise until the audible note just ceases. Press the test button in the side of the control box. A loud note should be heard; this should cease again when the test button is released.

(3) Perform the following check for the correct adjustments, by using the test box (*b*(5) above):

(*a*) *Normal adjustment.* With the control box switch set at NORMAL, turn the test box switch to "0". Hold the box about 2 feet above the center of the search head and lower it slowly until it causes an audible signal in the headset. Measure the distance above the search head. Repeat this test with the switch set at "−" and again with it set at "+". The distances should not be less than 12½ inches when the switch is set at "0" and 9 inches when it is set at "+" or "−". The difference between the "+" and "−" readings should not be greater than 2 inches.

(*b*) *PAVE adjustment.* With the control box set at PAVE, proceed as directed in (*a*) above. The readings should not be less than 10 inches when set at "0" or at "−" and at least 6 inches less than either of those readings when set at "+".

(4) If the readings with the test box are unsatisfactory, the iron-dust core which reduces mutual inductance may require adjustment. This is done as follows:

(*a*) Set the control box switch to NORMAL and turn the REGEN control knob fully counterclockwise.

(*b*) Remove the iron-dust-core cover and loosen the locknut. Reverse the cover and use it as a tool to turn the iron-dust core. Turning the core clockwise should produce a low tone in the headset and turning it counterclockwise, a high tone. If the opposite occurs, turn the iron-dust core clockwise a half-turn. The iron-dust core is set halfway between high and low tones.

(*c*) Turn the REGEN control clockwise until a loud tone just commences in the headset, and again adjust the iron-dust core halfway between high and low tones.

993037°—52——6

(*d*) Repeat the above adjustments until, with the iron-dust core set halfway between high and low tones, the REGEN control can no longer be turned clockwise without causing a loud tone in the headset.

(*e*) Turn the iron-dust core carefully counterclockwise until the high tone is faintly heard. Tighten the locknut.

(*f*) Test the adjustments with the test box for both NORMAL and PAVE settings: If, when the switch is on NORMAL, the "+" reading is more than 2 inches greater than the "—" reading, turn the iron-dust core very slightly clockwise and repeat the test. If the "+" reading is less than the "—" reading, turn the iron-dust core slightly counterclockwise and repeat the test.

(*g*) Replace the iron-dust-core cover after a satisfactory test.

(5) Lower the search-head to within 5 to 8 inches from the ground and parallel with it. Begin to sweep in wide arcs from side to side, taking a step forward with each sweep.

(6) The pace taken each time should roughly correspond with the length of the search-head; otherwise, some ground will remain unsearched.

(7) Press the test button from time to time to ascertain that the equipment is still working correctly. If no note is heard, repeat the action described in (4) above.

(8) If small objects are being sought, the search-head must be *close to the ground and the sweep must be deliberate.*

(9) In the case of deeply buried objects, reaction will be slow; that is, the signal will take as much as a second to develop to full strength. If the search-head is carried across the area too quickly, it is possible for the detector to fail to register. The nearer to the surface the object is buried, the more instantaneous the reaction to it.

(10) When searching while kneeling or lying prone, the operator carries a light stick in the one hand to search for trip wires and the detector in the other hand. The telescopic pole is not used. Having searched for trip wires and buried mines, the operator then moves or crawls forward, being careful not to move onto unsearched ground.

PART THREE

FRENCH MINE WARFARE EQUIPMENT

Chapter 8

INTRODUCTION

55. General

At the time of the German invasion of France in World War II, French mine warfare equipment was limited to five fuzes, only two standard antitank mines, one standard antipersonnel mine, and one electronic mine detector. All this equipment was produced in 1940 or earlier. Following the liberation of France, the French Army used German, Italian, British, and American mine warfare equipment in addition to their own.

56. Mines Manufactured During World War II

During World War II, French material was used to produce four models of antipersonnel mines for the German Army. These mines were the pot mine A 200, the pot mine S 150, the antipersonnel mine W–1, and the grenade mine E–5 (TM 5–223C). These mines were manufactured in France both by the French and by German Army ordnance battalions.

Chapter 9

FUZES

57. French Antitank Mine Pressure Fuze, M–1935 and 1936

a. Description. The French antitank mine pressure fuze, M–1935 and 1936 (fig. 77) is of the instantaneous, mechanical type and contains a spring-loaded striker with a shear-pin release. The shear pin passes through the striker shaft and the top of the fuze case. The percussion cap is contained in the detonator holder and is held in place by a hollow screw which gives the striker access to the cap. The detonator holder fits into the bottom of the fuze and is held in place by the detonator assembly which screws into the bottom of the fuze. The M–1935 fuze is made of steel with a brass percussion-cap holder and detonator assembly, while the M–1936 fuze is made of aluminum with an aluminum percussion-cap holder and detonator assembly.

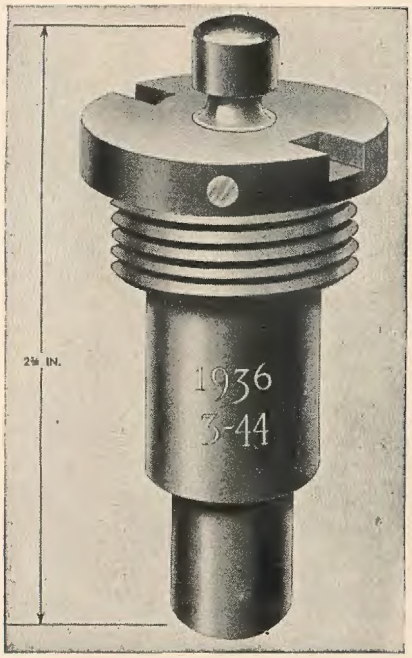


Figure 77. French antitank mine pressure fuze M–1935 and 1936.

b. Employment. This fuze is used in both the light and the heavy French antitank mines (pars. 62 and 63).

c. Functioning. A pressure of 400 pounds, or more, on the striker shaft shears the shear pin and releases the spring-loaded striker against the percussion cap, firing the detonator.

d. Installing and Arming.

(1) Holding the fuze upside down, insert into it the detonator holder containing the

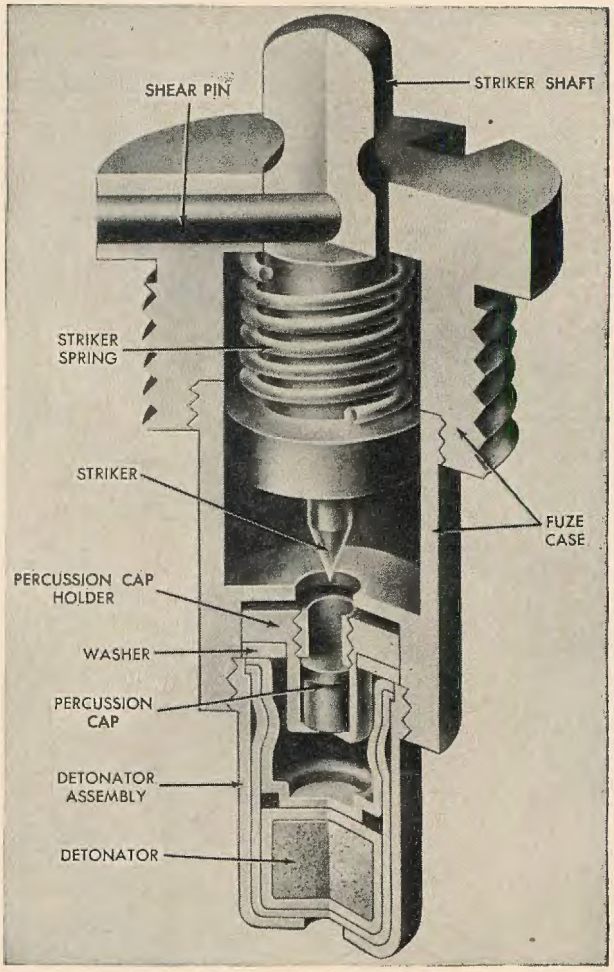


Figure 77—Continued.

percussion cap. The washer is inserted after the holder.

(2) Screw the detonator assembly into the bottom of the fuze.

(3) Screw the fuze into the mine.

Note. The fuze has no safety device and is armed when the percussion-cap holder and the detonator assembly are screwed into it.

e. Neutralizing.

(1) Unscrew the fuze from the mine.

(2) Unscrew the detonator assembly from the bottom of the fuze and remove the percussion-cap holder.

58. French Pressure Fuze for the Improvised Antitank Shell Mine

a. Description. The French pressure fuze (fig. 78) for the improvised antitank shell mine (par. 64) is of the instantaneous, mechanical type and contains a percussion type striker with a shear-pin release. The striker shaft has a pressure head and is held in place by a shear pin which passes through the striker shaft and the fuze case. An elongated metal flash tube has a well in the top for the percussion-cap-and-detonator assembly. The top of the flash tube screws into the bottom

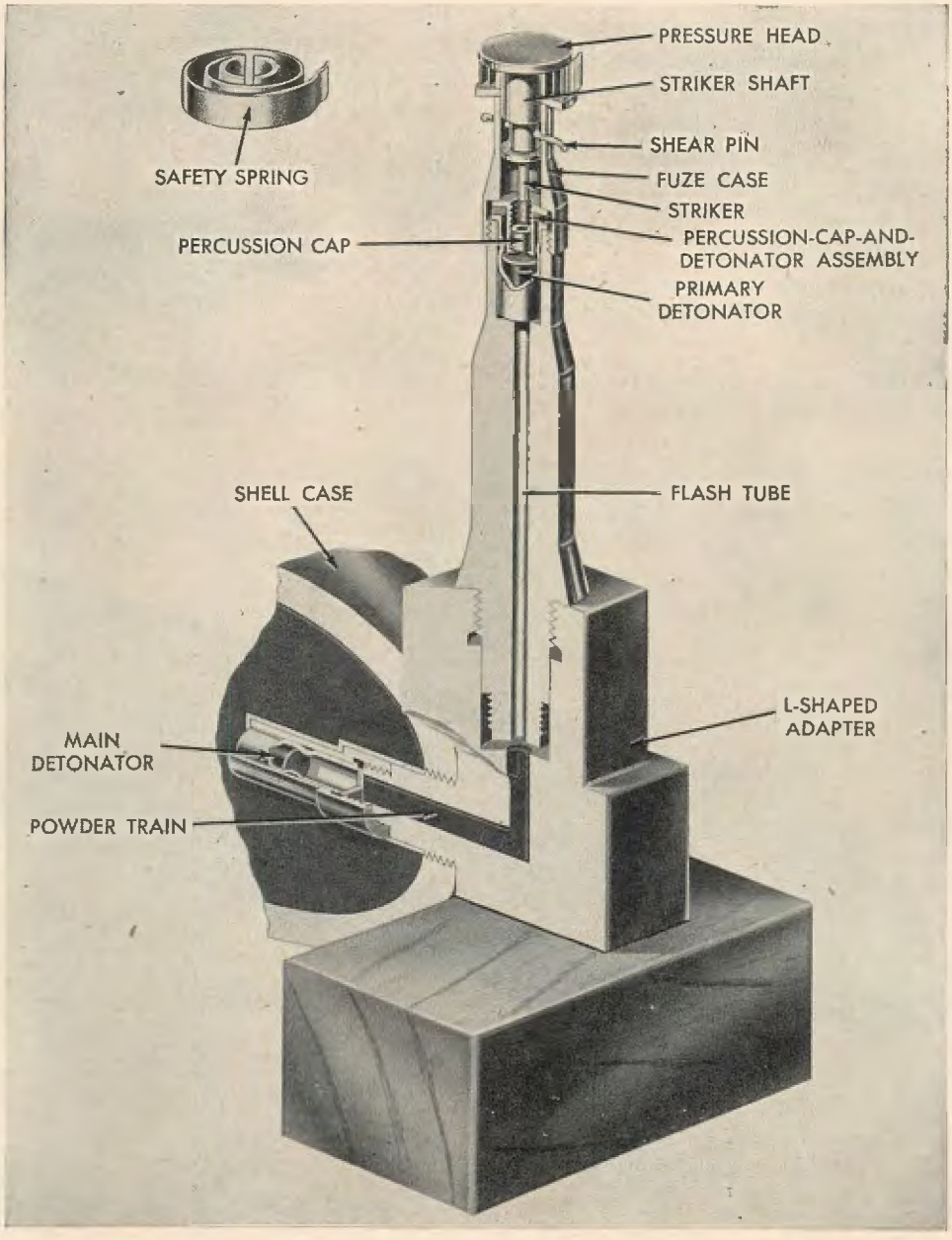


Figure 78. French pressure fuze for the improvised anti- tank shell mine.

of the fuze. The bottom of the flash tube screws into a metal L-shaped adapter which, in turn, screws into the shell. This L-shaped adapter has a powder train leading from beneath the flash tube to the main detonator, which is located in the nose of the shell. The detonator provided in the percussion-cap-and-detonator assembly is the primary detonator. A flat coil spring wound around the striker shaft, just below the pressure head, is a safety device. This safety spring is removed when the mine is armed.

b. Employment. This fuze was designed for use in the improvised antitank shell mine.

c. Functioning.

(1) Pressure of over 600 pounds on the pressure head shears the shear pin, forcing the striker onto the percussion cap.
(2) The percussion cap fires the primary detonator, igniting the powder train.
(3) The powder train fires the main detonator and the shell.

d. Installing and Arming.

(1) Insert the percussion-cap-and-detonator assembly in the well in the top of the flash tube.
(2) Screw the fuze onto the flash tube.
(3) Remove the safety spring.

e. Neutralizing.

(1) Unscrew the fuze from the flash tube without exerting any pressure on the pressure head.
(2) Remove the percussion-cap-and-detonator assembly from the flash tube.

59. French Snap Fuze, Ollivier

a. Description. The French snap fuze, Ollivier (fig. 79) is of the instantaneous, mechanical type and contains a spring-loaded striker with a snap release. The striker is held in the cocked position by the striker-retaining nut on the threaded end of the striker shaft which projects from the striker-retaining piece. The middle of the striker shaft is turned down to a much smaller diameter than the rest of the shaft to form a snap

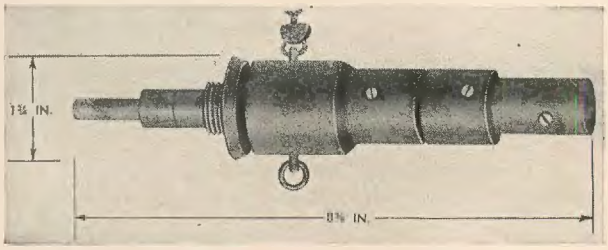


Figure 79. French snap fuze, Ollivier.

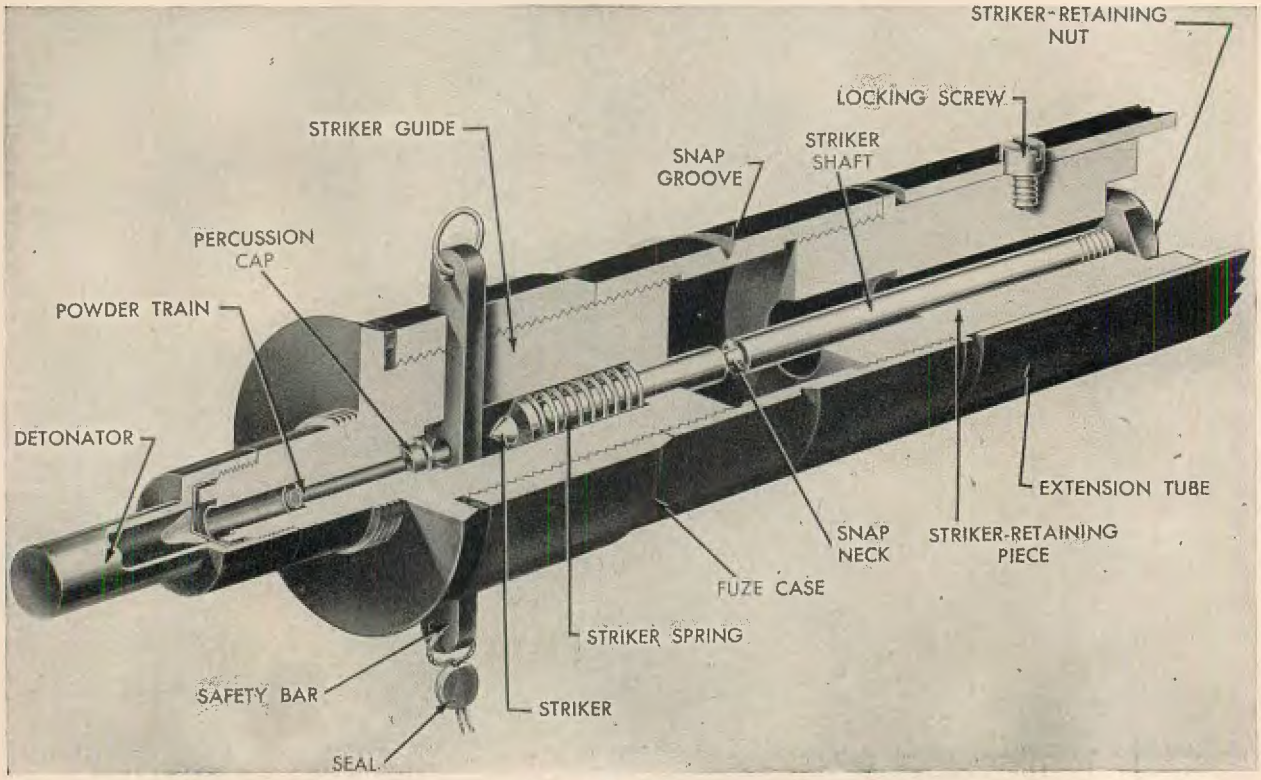


Figure 79—Continued.

neck coinciding with the snap groove around the fuze case. A safety bar is inserted through the fuze case between the striker and the percussion cap. The base of the fuze is externally threaded to fit the nose of a 12- or 15-cm shell. A metal extension tube fits over the portion of the striker-retaining piece which projects from the fuze. A locking screw is provided to hold the extension tube to the striker-retaining piece. A detonator is screwed onto the base of the fuze and is separated from the percussion cap by a ¾-second-delay powder train.

b. Employment. This fuze was designed for use with improvised mines and was camouflaged as pickets in wire obstacles and fence posts (fig. 80) or was hidden in thick undergrowth or bushes.

c. Functioning.

(1) Lateral pressure, applied near the top of the extension tube, snaps the fuze case at the snap groove and the striker shaft

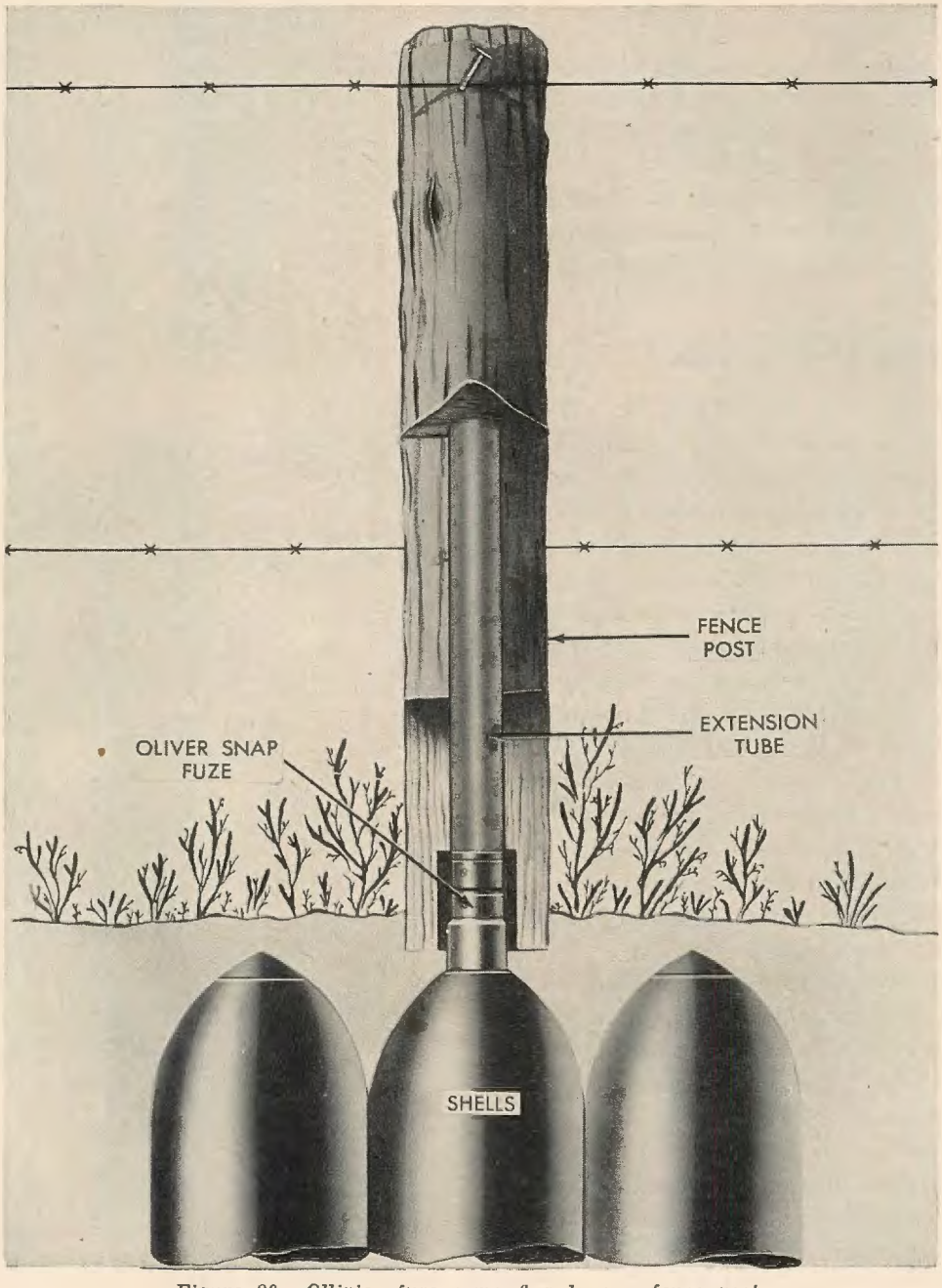


Figure 80. Ollivier fuze camouflaged as a fence post.

at the snap neck, releasing the spring-loaded striker against the percussion cap.

(2) The percussion cap ignites the ¾-second-delay powder train which, in turn, fires the detonator.

d. Installing and Arming.

(1) Screw the detonator onto the base of the fuze.

(2) Screw the fuze into the nose of a shell.

(3) Fit the extension tube over the top of the fuze and secure it with the locking screw.

(4) Break the seal and withdraw the safety bar.

e. Neutralizing.

(1) Replace the safety bar. If the safety bar cannot be found, use a nail or a narrow piece of metal.

(2) Unscrew the fuze from the shell, gripping the fuze below the snap groove.

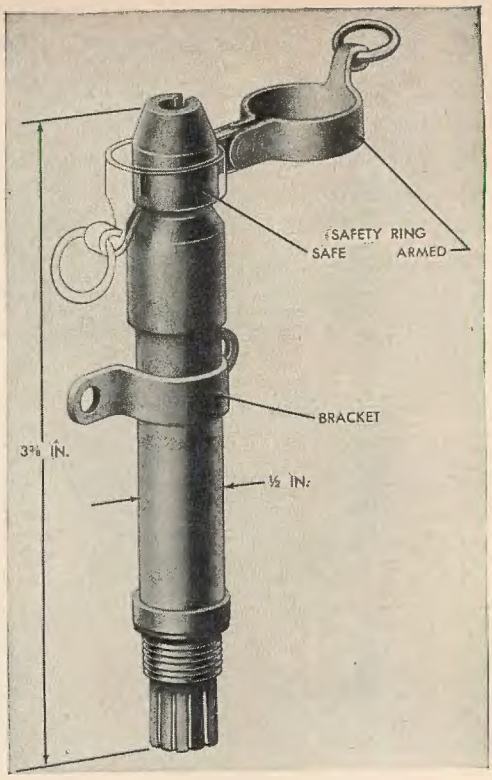
(3) Unscrew the detonator from the base of the fuze.

60. French Pull Fuze, M–1939

a. Description. The French pull fuze, M–1939 (fig. 81) is of the instantaneous, mechanical type and contains a spring-loaded striker with a pull-bar release. The top of the striker shaft is slotted. A retaining pin, slightly shorter in length than the diameter of the striker shaft, bridges the slot in the striker shaft. The pull bar extends through the fuze case and the slot in the striker shaft so that the retaining pin bears against the top of the pull bar. Hinged to the outer end of the pull bar is the safety ring, which can be folded over the top of the fuze so that the pull bar cannot be withdrawn. Attached to the end of the safety ring is the pull ring. A percussion-cap-and-detonator holder is screwed into the base of the fuze. A bracket is welded to the fuze case and is used to fasten the fuze to an object.

b. Employment. This fuze was designed for use with the antipersonnel bounding mine, M–1939 (par. 65) and can also be used with improvised grenade and shell mines, or with standard demolition equipment.

c. Functioning. With the safety ring removed from the top of the fuze and in the armed position, a pull on the pull ring allows the pull bar to clear the retaining pin, releasing the spring-loaded



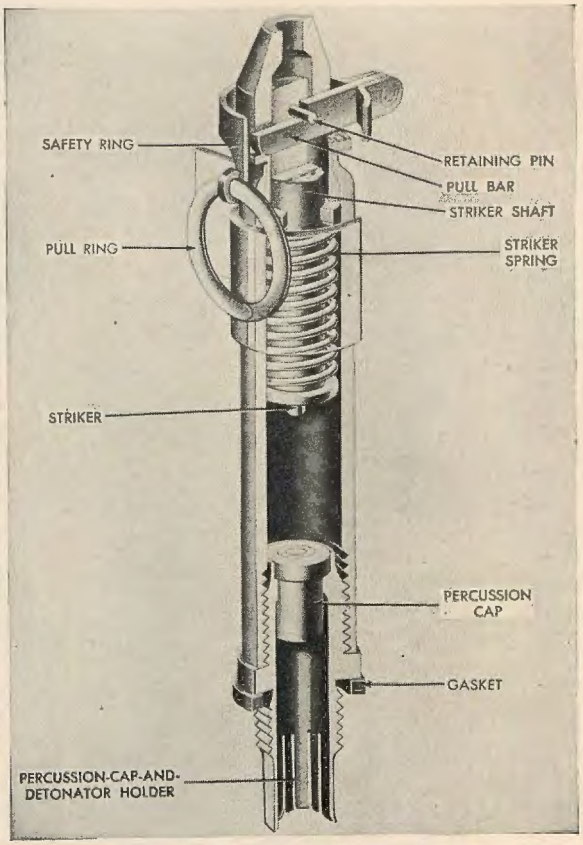


Figure 81. French pull fuze, M–1939.

striker against the percussion cap and firing the detonator.

d. Installing and Arming.

(1) Fit the detonator into the percussion-cap-and-detonator holder and screw the holder into the base of the fuze.
(2) Screw the fuze into the charge or mine.
(3) Unfold the safety ring from the top of the fuze.
(4) Tie an anchored trip wire to the pull ring.

e. Neutralizing.

(1) Cut the slack trip wire.
(2) Place the safety ring over the top of the fuze in the safe position.
(3) Unscrew the fuze from the charge or mine.
(4) Unscrew the percussion-cap-and-detonator holder from the base of the fuze and remove the detonator.

61. French Pressure-Pull Fuze, S. E. M. G.

a. Description. The French pressure-pull fuze, S. E. M. G. (fig. 82) is of the instantaneous, mechanical type and contains a spring-loaded striker which is actuated either by pressure on the pressure head of a plunger or by pull on a pull pin. The fuze consists of the main plunger, the main spring, the spring-loaded actuating sleeve, the spring-loaded striker, the guide piece, the spring-loaded dome-headed plunger, the pull-pin-retaining plunger, the pull pin, the safety pin, the fuze case, and the screw cap. The main plunger protrudes through the screw cap and has a pressure head screwed onto it. The top of the actuating sleeve fits into the main plunger and is locked to it by the pull pin and the safety pin. The safety pin prevents the main plunger from being depressed. The main spring fits inside the fuze case and supports the main plunger. The actuating spring is compressed between the bottom of the main plunger and a shoulder on the actuating sleeve. The actuating sleeve serves as a guide for the striker, which is locked to the actuating sleeve by the striker-retaining ball. The striker-retaining ball fits into a hole in the side of the actuating sleeve and is held in place by the guide piece. Inside the striker spring is the plunger spring for the dome-headed plunger. When the safety pin is withdrawn, the dome-headed plunger moves upward and blocks the safety-pin hole. It also presses against the pull-pin-retaining plunger, which holds a ball in an indentation in the bottom of the pull pin. With the safety pin in place, the pull pin cannot be withdrawn because the pull-pin-retaining ball is held rigidly in the indentation in the pull pin. With the safety pin withdrawn, the pull pin is removed against the resistance of the plunger spring and a cotter fork that grips the groove around the main plunger. Both the pull pin and the cotter fork are hinged to the actuating lever, which has a pull ring on the end. The lower portion of the screw cap is knurled. A shoulder on the fuze case, just below the screw cap, is slotted for taking a "C" spanner wrench for unscrewing the fuze from the charge. A percussion-cap-and-detonator holder is screwed into the base of the fuze.

b. Employment. This fuze is employed in the antipersonnel bounding mine, M–1939 (par. 65). It is also used in improvised mines.

c. Functioning.

(1) *Pressure.* A pressure of from 90 to 100 pounds on the pressure head causes the main plunger and actuating sleeve to move downward against the resistance of the main spring until the striker-retaining ball clears the guide piece, releasing the spring-loaded striker against the percussion cap.
(2) *Pull.* A 9-pound pull on the trip wire attached to the pull ring on the actuating lever pulls out the pull pin, freeing the actuating sleeve from the main plunger. The compressed actuating spring forces the actuating sleeve downward until the striker-retaining ball clears the guide piece, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Screw the percussion-cap-and-detonator holder, with detonator, into the base of the fuze.
(2) Screw the fuze into the fuze well in the mine or charge.
(3) Tie an anchored trip wire to the pull ring.
(4) Unscrew the safety nut from the safety pin and pull out the safety pin.

e. Neutralizing.

(1) Insert the safety pin. The safety pin has a beveled end; it must be inserted with the edge uppermost to engage the dome-headed plunger which has risen under the action of the compressed plunger spring and blocked the safety-

pin hole. Screw the safety nut onto the end of the safety pin.

(2) Cut the trip wire.

(3) Unscrew the fuze from the mine or charge.

Caution: When unscrewing the fuze, *never* grip the fuze by the knurled screw cap since this action will unscrew the screw cap from the fuze case, allowing the main plunger and actuating sleeve to rise under the action of the compressed main spring until the striker-retaining ball clears the top of the guide piece, releasing the spring-loaded striker against the percussion cap. The fuze must be gripped by the slotted collar. A special "C" spanner wrench should be used on this collar.

(4) Unscrew the percussion-cap-and-detonator holder from the base of the fuze and remove the detonator.

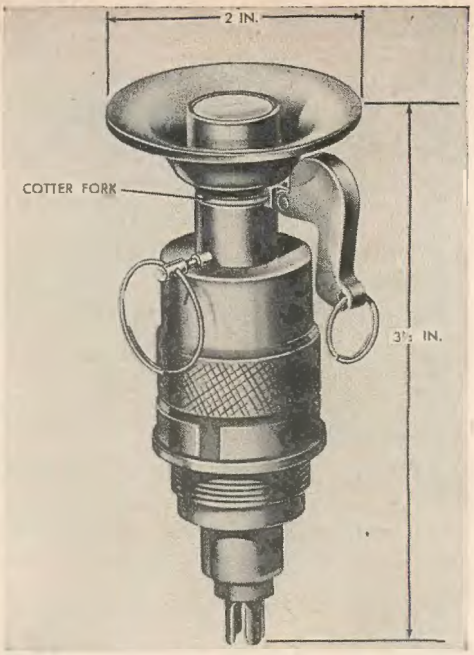


Figure 82. French pressure-pull fuze, S. E. M. G.

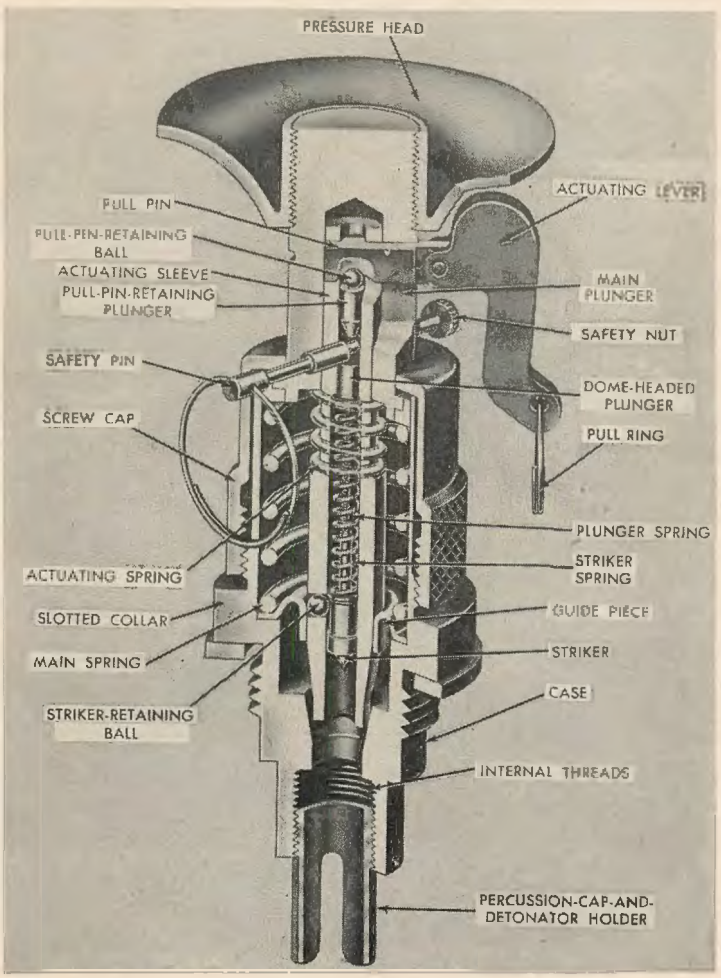


Figure 82—Continued.

Chapter 10

MINES AND MINE DETECTING EQUIPMENT

62. French Light Antitank Mine, M–1936

a. Description. The French light antitank mine, M–1936 (fig. 83) has a rectangular steel charge container, 9½ inches long, 5½ inches wide, and 4½ inches high. The mine weighs 14.5 pounds, including 5.75 pounds of explosive. It uses the pressure fuze, antitank, M–1935 and 1936 (par. 57). Two fuze wells are located in the top of the charge container. The flanged base plate has a hole in each corner for hold-down bolts when the mine is laid in permanent defensive positions. A corrugated pressure cover fits over the charge container and is strengthened by a metal strip. Two metal pressure bars are welded to the underside of the pressure cover and are positioned above the fuzes when the cover is in place. A channel-shaped aluminum safety bar passes longitudinally through the pressure cover and rests over the fuzes, preventing them from being actuated. Wires or chains attached to both ends of the base plate fit over hooks on the pressure cover to hold the cover in place. One of the wires or chains is permanently attached to the pressure cover and the base plate.

b. Employment. This mine was designed for employment in antitank mine fields and in permanent defensive positions.

c. Functioning. A pressure of from 300 to 500 pounds on the pressure cover causes downward movement of the attached pressure bars against the striker shaft of one or both of the fuzes shearing the shear pin. Shearing the pin releases the spring-loaded striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Place the mine in a hole deep enough for the top of the mine to be flush with the ground surface or a little below it. When laying a mine field or belt, keep 6-foot intervals, at least, between mines.

(2) Remove the pressure cover and screw two pressure fuzes, antitank, M–1935 and 1936, with percussion-cap-and-detonator assemblies, into the fuze wells.

(3) Insert the safety bar through the holes in the ends of the pressure cover.

(4) Replace the pressure cover and put the wire or chain over the hook to hold it in place.

(5) Withdraw the safety bar.

e. Neutralizing.

(1) Check for and neutralize any activating fuzes. The pressure cover may have an activating fuze attached. Examine the pressure cover carefully and then take the wire or chain off the hook.

(2) Lift the pressure cover. If there is any evidence of activation, pull the pressure cover off with a rope or wire. Stay a distance of 50 yards from the mine.

(3) Unscrew and remove both fuzes.

(4) Unscrew the percussion-cap-and-detonator assemblies from the bottoms of the fuzes.

63. French Heavy Antitank Mine, M–1935

a. Description. The French heavy antitank mine, M–1935 (fig. 84) has a rectangular steel charge container welded to a steel base. The mine is 16⅛ inches long, 10 inches wide, and 4¾ inches high. It weighs 27 pounds including 3.25 pounds of explosive. A hinged, steel pressure cover fits over the charge container and is held in place by two wing nuts. In the top of the charge container is a single fuze well. The fuze used in this mine is the pressure fuze, antitank, M–1935 and 1936 (par. 57). A doughnut-shaped metal-cased booster charge is provided and is placed in the fuze well when the mine is armed. A threaded shipping plug closes the fuze well. A metal safety collar

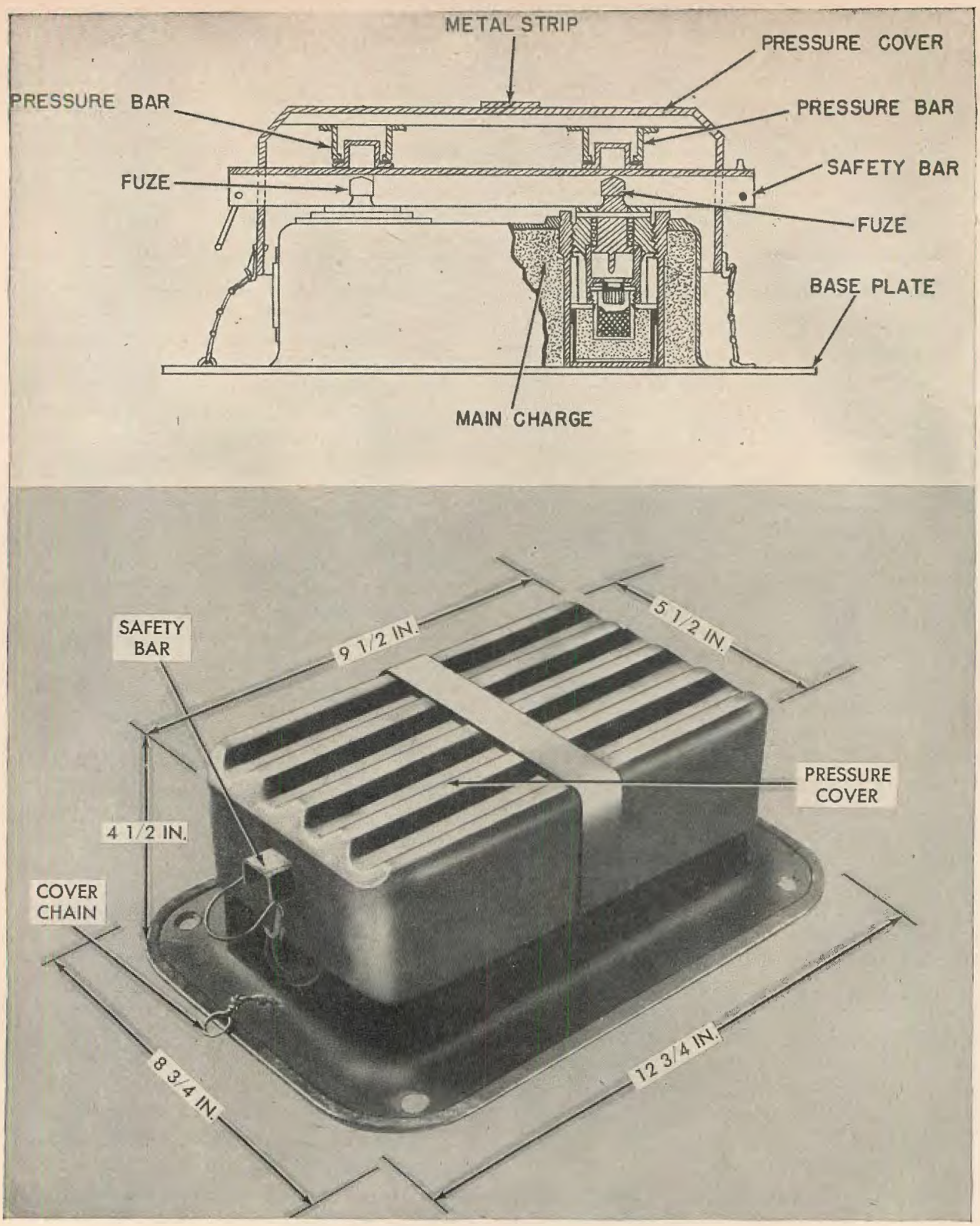


Figure 83. French light antitank mine, M–1936.

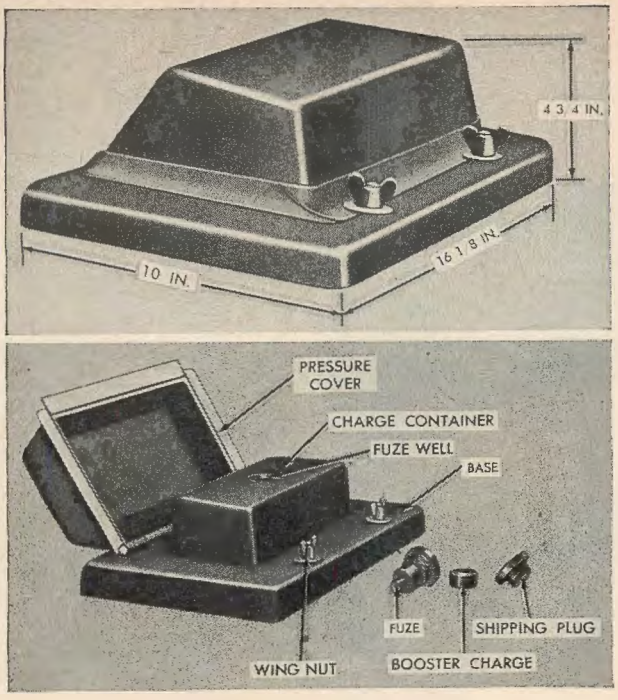


Figure 84. French heavy antitank mine, M–1935

is provided to surround the fuze if the mine is shipped with the fuze in place.

b. Employment. This mine was designed for employment in permanent defensive installations.

c. Functioning. A pressure of about 800 pounds on the pressure cover crushes the cover until it bears against the striker shaft of the fuze, shearing the shear pin. Shearing the pin releases the spring-loaded striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Place the mine in a hole deep enough for the top of the mine to be flush with the ground surface or a little below it. When laying mine fields or belts, keep 6-foot intervals, at least, between mines.

(2) Lift up the pressure cover and unscrew the shipping plug from the fuze well, or remove the safety collar from around the fuze if the mine is shipped with the fuze in place.

(3) Insert the booster charge in the fuze well and screw in a pressure fuze, antitank, M–1935 and 1936, with percussion-cap-and-detonator assembly.

(4) Lower the pressure cover and fasten it with the wing nuts.

e. Neutralizing.

(1) Check for and neutralize activating fuzes.

(2) The pressure cover may have an activating fuze attached. After unfastening the wing nuts, pull the cover up with a rope or wire. Stay a distance of 50 yards from the mine.

(3) Unscrew the fuze.

(4) Unscrew the percussion-cap-and-detonator assembly from the bottom of the fuze.

(5) Lift out the booster charge.

64. French Improvised Antitank Shell Mine

a. Description. The French improvised antitank shell mine (fig. 85) consists of a single 120-mm shell in a wooden case. This case is fitted with a loose wooden pressure board, one end of which rests on the pressure head of the pressure fuze for the shell mine (par. 58), which is connected to the shell by a flash tube and an L-shaped adapter. The mine is 22 inches long, 5 inches wide, and 10 inches high. See paragraph 58 for details of the fuze assembly.

b. Employment. This mine is employed in mine fields and road blocks.

c. Functioning.

(1) A pressure of 680 pounds, or more, on the pressure board shears the shear pin of the fuze, forcing the striker onto the percussion cap.

(2) The percussion cap fires the primary detonator, igniting the powder train.

(3) The powder train fires the main detonator and the shell.

d. Installing and Arming.

(1) Insert a detonator in a detonator holder and screw the holder onto the side of the L-shaped adapter.

(2) Screw the L-shaped adapter into the nose of the shell.

(3) Screw the flash tube into the top of the adapter.

(4) Insert the percussion-cap-and-detonator assembly in the well in the top of the flash tube.

(5) Screw the fuze onto the flash tube.

(6) Remove the safety spring from the fuze.

(7) Fit the wooden pressure board on the mine case.

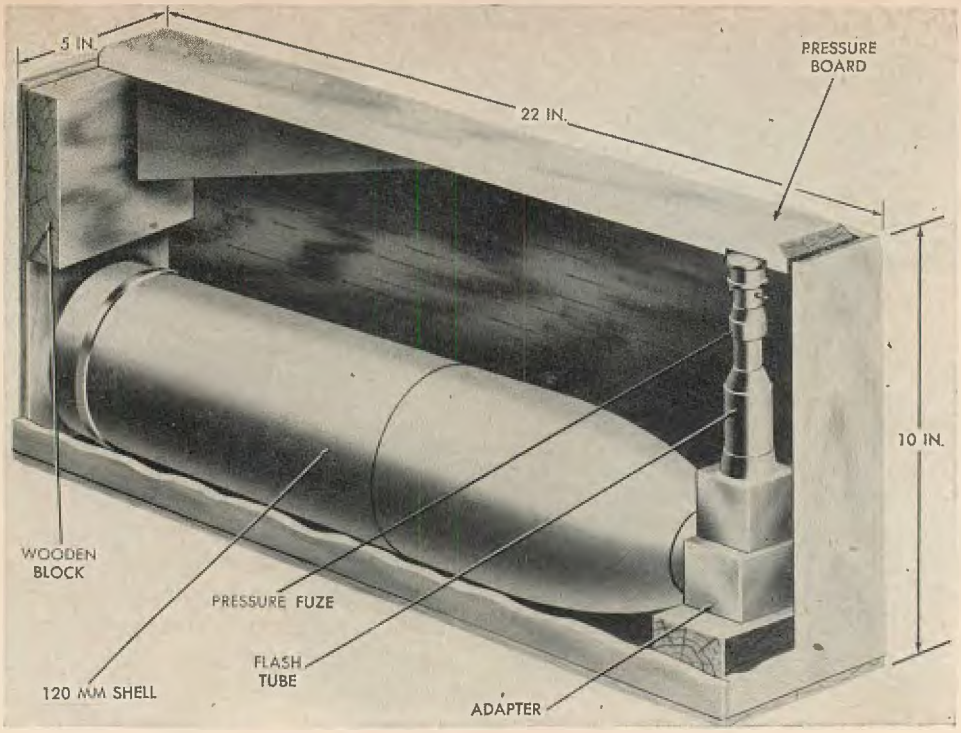


Figure 85. French improvised antitank shell mine.

e. Neutralizing.

(1) Carefully inspect the pressure board for pull wires and activating fuzes. If there is any indication that activating fuzes have been used, remove the pressure board with a rope or wire. Stay a distance of 50 yards from the mine.
(2) Unscrew the fuze from the flash tube without exerting any pressure on the pressure head.
(3) Remove the percussion-cap-and-detonator assembly from the flash tube.
(4) Unscrew the flash tube from the L-shaped adapter.
(5) Unscrew the adapter from the shell.
(6) Unscrew the detonator holder from the adapter.

65. French Antipersonnel Bounding Mine, M–1939

a. Description. The French antipersonnel bounding mine, M–1939 (fig. 86) consists of a mortar shell inclosed in a steel tube closed at the top by a cover. One end of an L-shaped flash tube is screwed to the base of the projectile tube. The other end of the flash tube is threaded to receive a fuze adapter. A rectangular metal support plate surrounds the flash tube and the steel tube. The mortar shell containing 5 ounces of explosive, is fitted with a delay pellet and a detonator. A propelling charge is located in the flash tube. This mine normally uses the pull fuze, M–1939 (par. 60), which screws into the base of the fuze

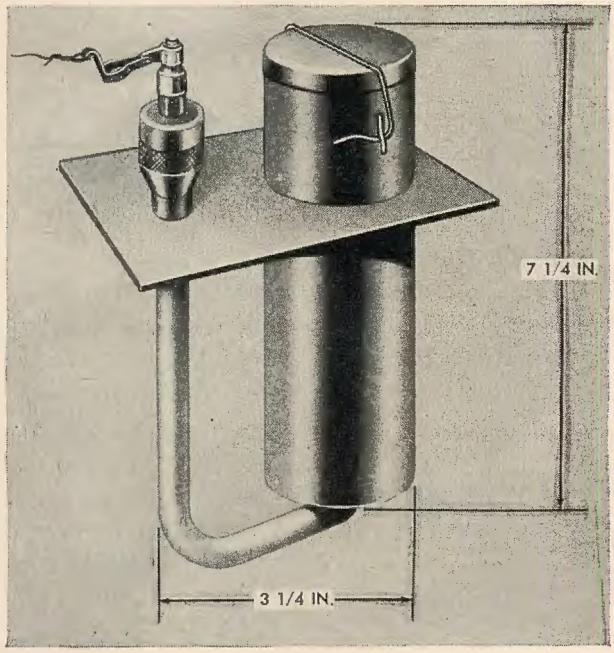


Figure 86. French antipersonnel bounding mine, M–1939.

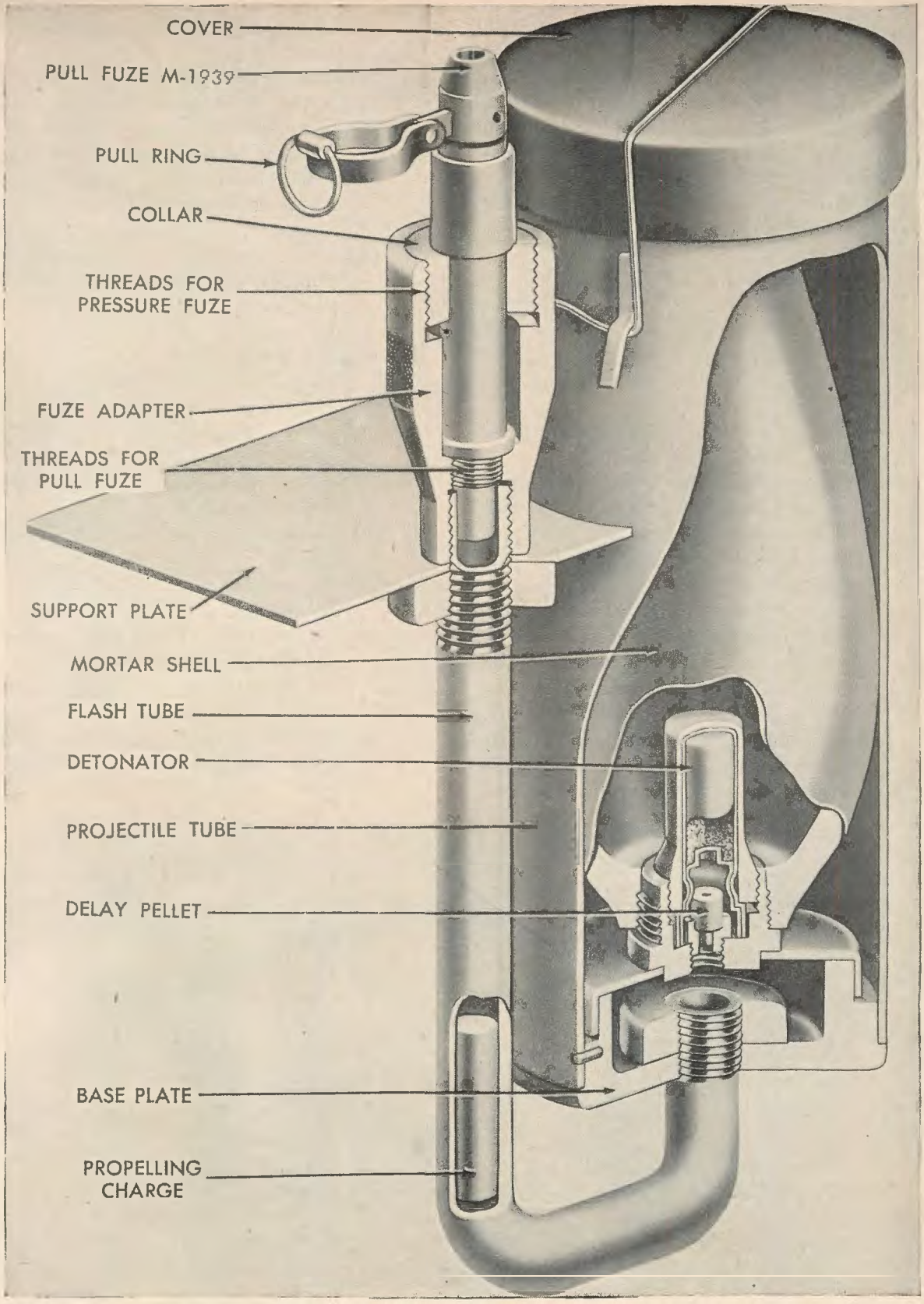


Figure 86—Continued.

adapter. A threaded collar is screwed into the top of the adapter when the pull fuze, M–1939 is used. The threads in the top of the adapter were designed to take the pressure-pull fuze, S. E. M. G. (par. 61), in which case the collar is omitted. The mine is 7¼ inches high and 3¼ inches wide and weighs 5.5 pounds. It has an effective casualty radius of 10 yards.

b. Employment. This mine was designed for employment in antipersonnel mine fields.

c. Functioning.

(1) *With the pull fuze, M–1939.*

(*a*) With the safety ring removed from the top of the fuze, a pull on the ring pulls out the pull bar, releasing the spring-loaded striker against the percussion cap.

(*b*) The flame from the percussion cap ignites the propelling charge.

(*c*) The propelling charge propels the mortar shell from the projectile tube and at the same time ignites the delay pellet, which burns through and fires the detonator.

(*d*) The detonator fires the main charge, which fragmentizes the mortar shell at a height of from 2 to 7 feet above the ground.

(2) *With the pressure-pull fuze, S. E. M. G.*

(*a*) A pressure of from 90 to 100 pounds on the pressure head or a 9-pound pull on the trip wire attached to the pull ring actuates the fuze, releasing the spring-loaded striker against the percussion cap.

(*b*) The flame from the percussion cap ignites the propelling charge.

(*c*) The propelling charge propels the mortar shell from the projectile tube and at the same time ignites the delay pellet, which burns through and fires the detonator.

(*d*) The detonator fires the main charge, which fragmentizes the mortar shell at a height of from 2 to 7 feet above the ground.

d. Installing and Arming.

(1) *With the pull fuze, M–1939 (fig. 87).*

(*a*) Place the mine in a hole so only the top of the fuze will be above the surface of the ground.

(*b*) Screw the threaded collar into the top of the fuze adapter.

(*c*) Screw the fuze into the base of the fuze adapter.

(*d*) Remove the safety ring from the top of the fuze.

(*e*) Connect an anchored trip wire to the pull ring of the fuze.

(2) *With the pressure-pull fuze, S. E. M. G. (fig. 87).*

(*a*) Place the mine in a hole so the top of the fuze will be flush with the surface of the ground.

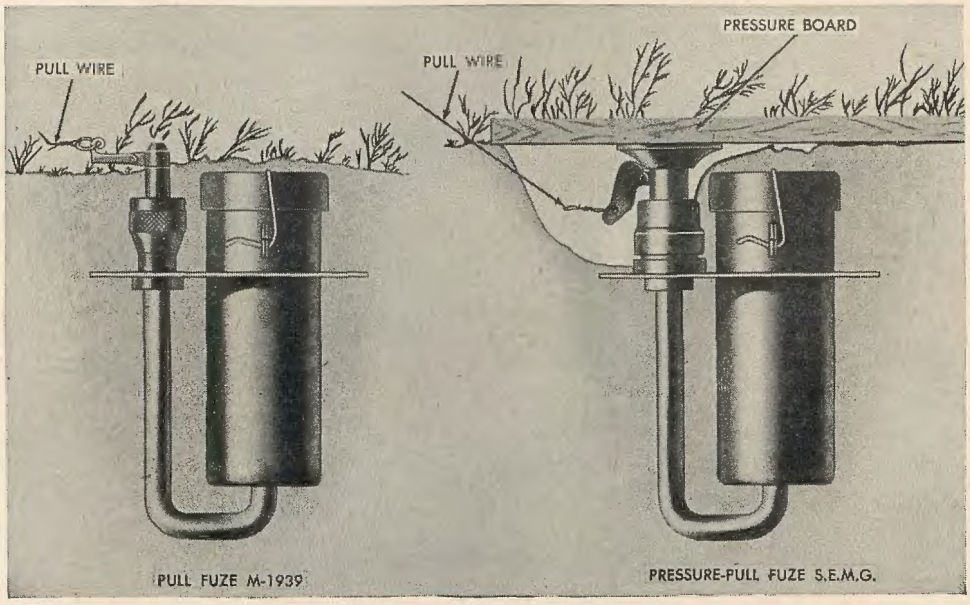


Figure 87. Installation of French antipersonnel bounding mine, M–1939.

(*b*) Screw the fuze into the top of the fuze adapter.
(*c*) Connect an anchored trip wire to the pull ring of the fuze.
(*d*) Unscrew the safety nut from the safety pin and pull out the safety pin.
(*e*) If desired, place a pressure board over the fuze for greater contact area.

e. Neutralizing.

(1) *When armed with the pull fuze, M–1939.*
(*a*) Cut the slack trip wire.
(*b*) Place the safety ring over the top of the fuze.
(*c*) Unscrew the fuze from the fuze adapter.

(2) *When armed with the pressure-pull fuze, S. E. M. G.*
(*a*) Insert the safety pin in the fuze. The safety pin has a beveled end; it must be inserted with the edge uppermost to engage the dome-headed plunger blocking the safety-pin hole. Screw the safety nut onto the end of the safety pin.
(*b*) Cut the trip wire.
(*c*) Unscrew the fuze from the fuze adapter.

Caution: When unscrewing the fuze (fig. 82) *never* grip the fuze by the knurled screw cap since this action will unscrew the screw cap from the fuze case, allowing the main plunger and actuating sleeve to rise under the action of the compressed main spring until the striker-retaining ball clears the top of the guide piece, releasing the spring-loaded striker against the percussion cap. The fuze must be gripped by the slotted collar. A special "C" spanner wrench should be used on this collar.

66. French Nonstandard Antipersonnel Shell Mine

a. Description. Although the French antipersonnel shell mine (fig. 88) is nonstandard, it is not a field-improvised mine. It consists of a wooden case which contains a main charge of two high-explosive shells and a booster charge of four sticks of gelignite. A sheet-metal pressure cover

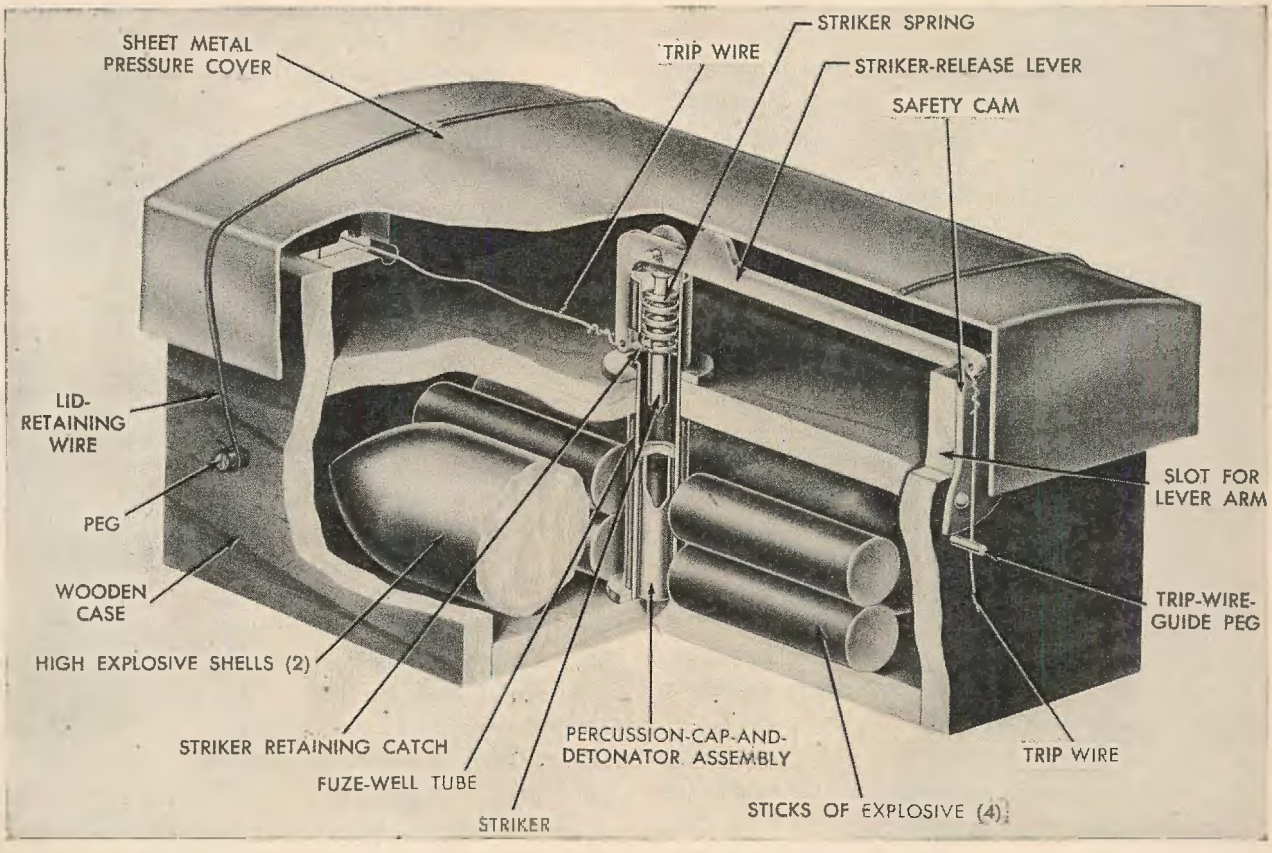


Figure 88. French nonstandard antipersonnel shell mine.

993037°—52——7

fits over the case and is held on by two lid-retaining wires which are fastened to pegs on the side of the case. A built-in fuze in centrally located and consists of the fuze-well tube, a spring-loaded striker, and an L-shaped actuating lever. The striker-retaining catch on the end of the vertical portion of the actuating lever extends through an opening in the side of the fuze-well tube and retains the striker. A safety cam at one end of the wooden case can be engaged in a groove at the end of the actuating lever so the fuze cannot be actuated. A percussion-cap-and-detonator assembly is contained in the lower part of the fuze-well tube.

b. Employment. This mine was employed as an antipersonnel mine in hasty mine fields and road blocks. It was also used in antitank mine fields to hinder the passage of reconnaissance and breaching parties.

c. Functioning. A pull on the trip wire at either end of the mine or pressure on the pressure cover causes the actuating lever to release the spring-loaded striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Insert the percussion-cap-and-detonator assembly in the lower part of the fuze-well tube.

(2) Insert the built-in fuze and make sure that the safety cam is up, so it engages in the groove at the end of the actuating lever.

(3) Install anchored trip wires to both ends of the actuating lever.

(4) Place the pressure cover on the mine and wire it in place.

(5) Rotate the safety cam so the cam disengages from the groove in the striker-release lever.

e. Neutralizing.

(1) Rotate the safety cam until it engages in groove at the end of the actuating lever.

(2) Cut the trip wires.

(3) Carefully cut or disconnect the two wires that hold the pressure cover on the wooden case, and lift the pressure cover.

(4) Carefully tape or wire the vertical portion of the actuating lever very tightly to the fuze-well tube.

(5) Being careful not to apply any downward pressure to the horizontal portion of the actuating lever, lift the fuze from the mine and remove the percussion-cap-and-detonator assembly from the bottom of the fuze-well tube.

67. French SFR–441 Mine Detector

a. Description. The SFR–441 mine detector (fig. 89) was produced before World War II and, although it is still used in training, it is not considered sensitive enough for combat use. The detector is of the regenerative type (par. 52*b*) in which a continual audible signal increases in pitch as the detector approaches a metallic body. This mine detector consists of three main parts:

(1) *Search coil and handle.* The search coil is a ring of tubing, and is 20 inches in diameter. The search handle can be folded to a length of 65 inches, or it may be unfolded to a length of 105 inches. The entire search handle weighs 5.5 pounds. A resistor is connected across the search-coil leads at the base of the search handle. The time control is located near the upper-sling connector where the cable from the amplifier-oscillator case connects to the search handle.

(2) *Amplifier and oscillator.* The amplifier and oscillator are contained in a case which is 12 inches long, 4½ inches wide, and 8 inches high. It weighs 10 pounds. The oscillator set uses two R 207 type electron tubes as pentode oscillators, one having a fixed frequency of about 1 megacycle, and the other, a frequency that is variable within a small range. When a metallic body is in the field of the search coil, the two oscillators beat together at the same frequency and produce a note of higher pitch in the headset. The amplifier set consists of electron tubes, batteries, and condensers, which are accessible by releasing the catches at each end of the case and removing the lid. Spring-loaded *A* cells are in the top of the case; a spring-connected high-tension battery is below the oscillators.

(3) *Headset.* The headset consists of two 2000-ohm head phones in series.

b. Employment. This mine detector is not highly sensitive to small bodies of metal. It will detect German Tellermines (TM 5–223C) buried to depths of about 15 inches and S-mine (TM 5–223C) buried to depths of about 8 inches. Smaller bodies of metal cannot be detected.

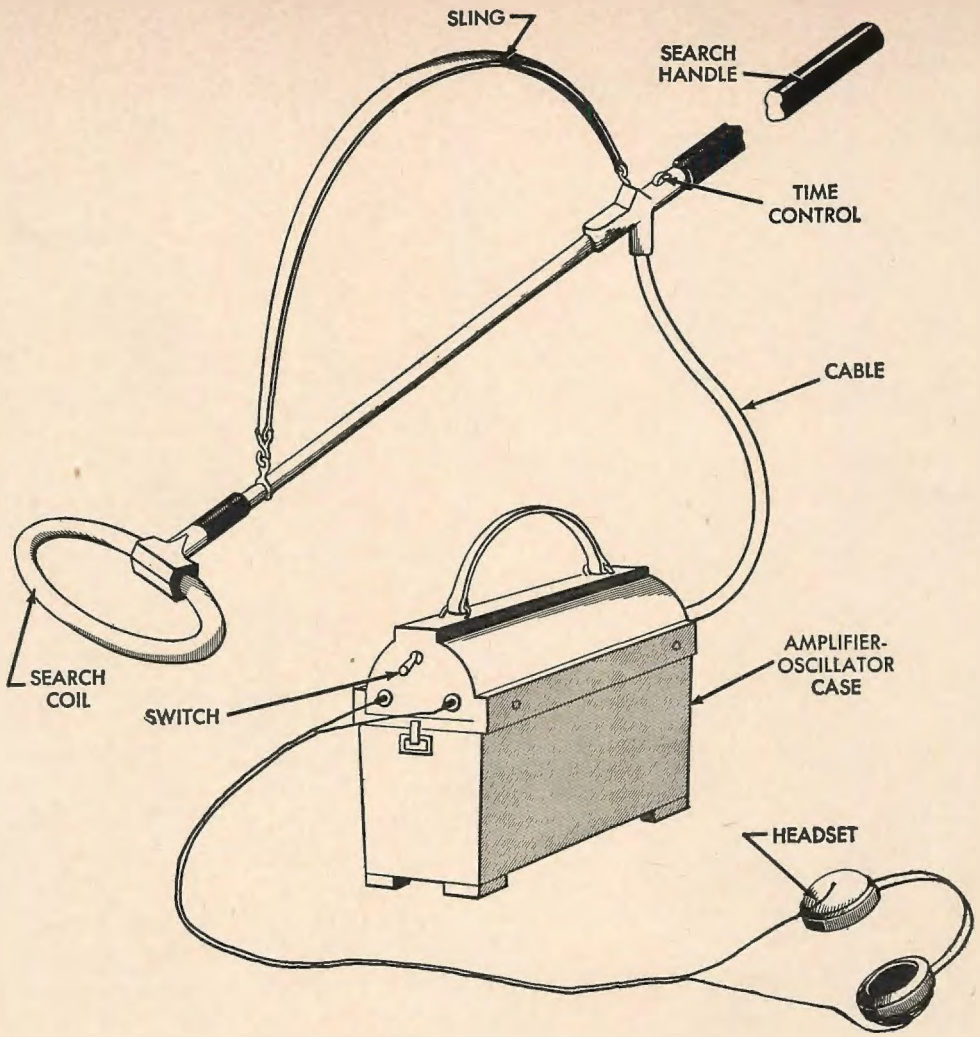


Figure 89. French SFR–441 mine detector.

PART FOUR

ITALIAN MINE WARFARE EQUIPMENT

Chapter 11

INTRODUCTION

68. Fuzes

Most Italian fuzes are built-in as an integral part of the mine. Each built-in fuze is described and illustrated as part of the mine (ch. 13). Separate fuzes are used in some of the later model mines. The Italian Army had some delayed action fuzes which were primarily used for the delayed detonation of large charges. These fuzes are described in chapter 12.

69. Mines and Mine Detecting Equipment

Italian mines are quite distinctive from those of other armies. The earlier Italian mines were generally long, rectangular, metal or wooden charge containers with built-in fuzes. Later models were generally round and made of nonmetallic substances with separate fuzes. Italian mine detecting equipment was limited to a single electronic mine detector (par. 92).

Chapter 12

DELAYED-ACTION FUZES

70. Italian Shear-Type Delay Fuze

a. Description. The Italian shear-type delay fuze (fig. 90) is of the delay, mechanical type and contains a spring-loaded striker with a lead shear pin release. It consists of a cylindrical steel case with a spring-loaded striker that is held in place by a lead shear pin inserted through the case and the hollow striker shaft. The top of the striker shaft protrudes out of the case and is threaded for taking a corrugated safety nut. The bottom of the striker shaft is threaded for taking a striker guide collar. The striker is pressed into the bottom of the hollow striker shaft. A safety set screw screws into the side of the case and engages in a longitudinal slot in the striker shaft to prevent it from rotating and thus shearing the lead shear pin. A threaded retaining collar holds the percussion-cap-and-detonator assembly to the base of the fuze.

b. Employment. This fuze is used for the delayed detonation of charges or mines in areas being abandoned to an opposing force.

c. Functioning. After a period of from 7 to 25 hours from the time the corrugated safety nut is removed, the lead shear pin fails in shear, due to fatigue brought about by the action of the compressed striker spring, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Secure the percussion-cap-and-detonator assembly to the base of the fuze with the threaded retaining collar.

(2) Unscrew the corrugated safety nut and remove it. This puts all the force of the compressed striker spring on the lead shear pin.

e. Neutralizing.

(1) Firmly grasp the threaded end of the striker shaft that protrudes from the top of the case with a pair of pliers so that the striker shaft cannot move downward. Once the striker shaft is grasped, do not loosen the hold on the pliers until the fuze is neutralized.

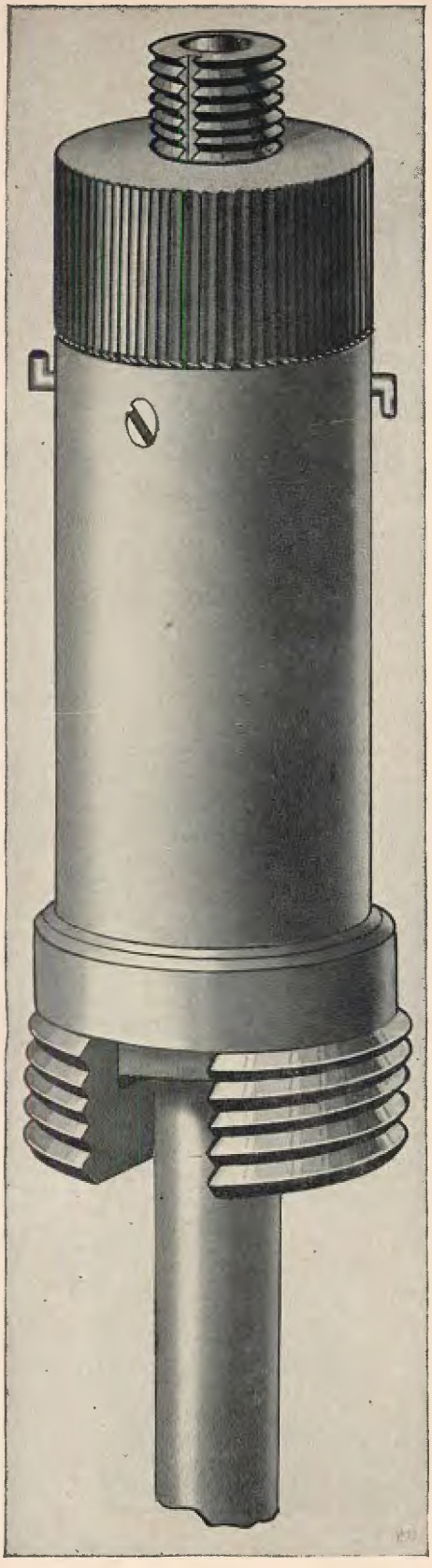
(2) Grasp the fuze case with the free hand and unscrew it from the mine or charge.

(3) Remove the percussion-cap-and-detonator assembly from the fuze by unscrewing the retaining collar.

71. Italian Chemical Delay Fuze

a. Description. The Italian chemical delay fuze (fig. 91) is of the delay, mechanical type and contains a spring-loaded striker with a celluloid-washer release. The upper portion of the cylindrical aluminum alloy case has square threads for taking an adapter collar. The color of the square threads denotes the delay period. Unpainted threads indicate a 1-hour-and-45-minute delay, gray threads a 2-hour-and-20-minute delay, and red threads a 3-hour delay. *These threads are not visible when the fuze is armed.* The lower portion of the case is threaded for taking a retaining collar. Between the two threaded portions is a knurled shoulder fitted with a fiber washer. The spring-loaded striker is held to an inner housing of the case by a celluloid washer that fits over the threaded end of the striker shaft so as to bear against the top of the housing. A nut screws onto the striker shaft against the celluloid washer to keep the spring-loaded striker in place after the safety pin is removed. Surrounding the inner housing is a reaction chamber. An aluminum ring fits on the top of the adapter collar. A lead closing disk rests on the fuze case inside the aluminum ring. An acetone-filled cap with two knurled bands fits over the aluminum ring and screws onto the adapter collar. A vertical steel pin inside the acetone-filled cap is for the purpose of puncturing the lead closing disk when the adapter collar, with the acetone-filled cap, is screwed down against the fiber washer on the shoulder of the fuze case. This action forces the acetone into the reaction chamber. An air hole at the bottom of the chamber lets the air escape. A percussion-cap-and-detonator assembly is held to the base of the fuze by the retaining collar, which screws into the charge. A double-pronged safety pin is inserted in the adapter collar and the fuze case.

b. Employment. This fuze is used for the delayed detonation of charges.



c. Functioning. Screwing the adapter collar, with the acetone-filled cap, down against the fiber washer on the shoulder of the fuze case punctures the lead closing disk and forces the acetone into the reaction chamber where it dissolves the celluloid washer, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Withdraw the safety pin.

(2) Holding the fuze horizontally, with the air hole leading into the reaction chamber

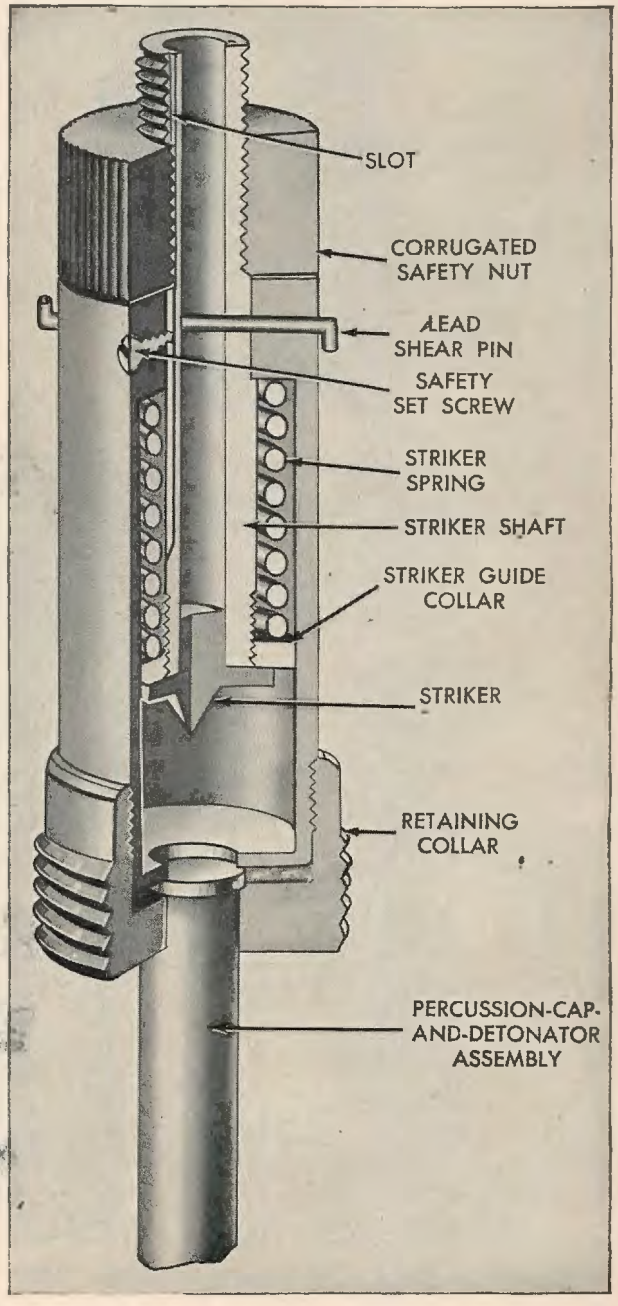


Figure 90. Italian shear-type delay fuze.

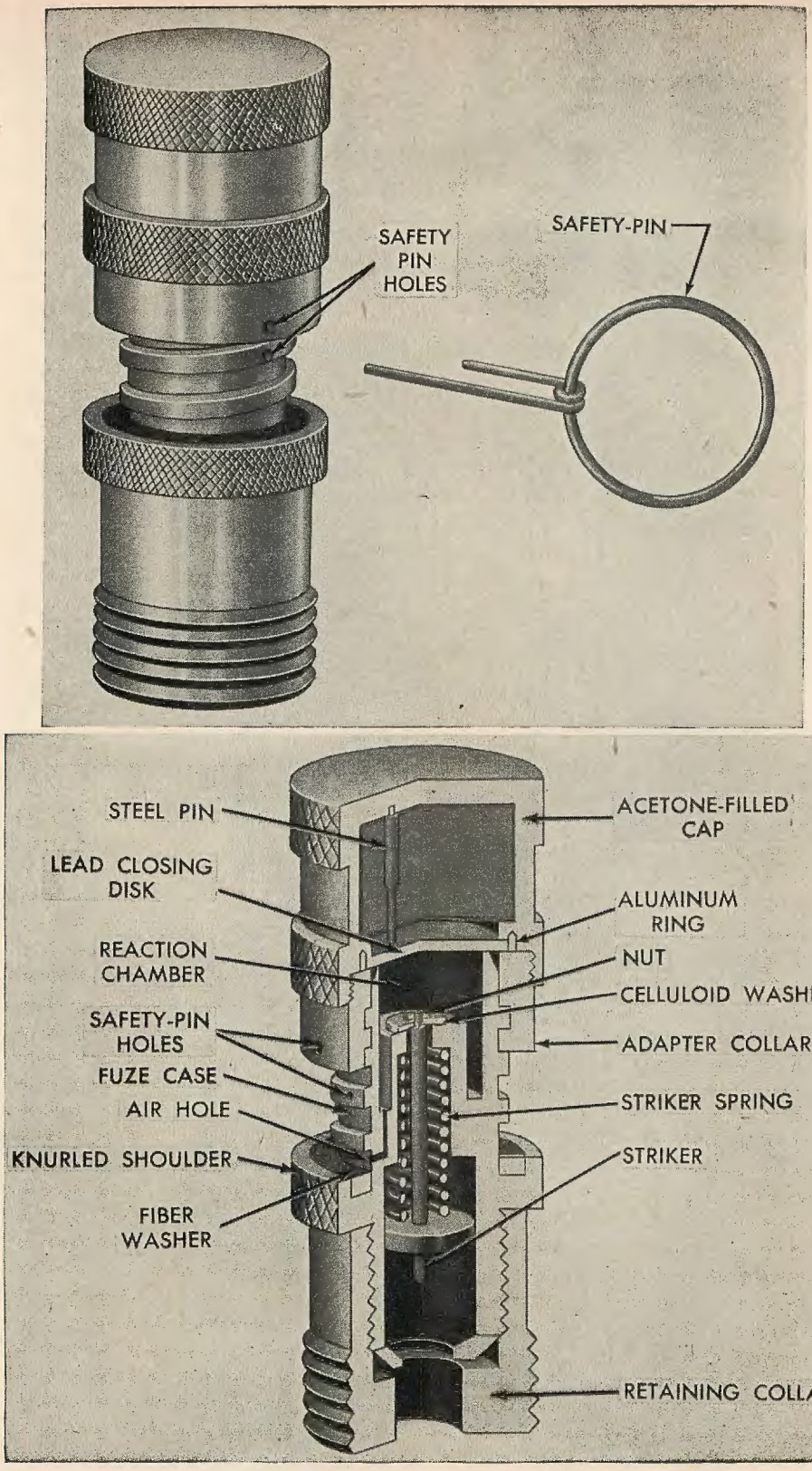


Figure 91. Italian chemical delay fuze.

pointing up, screw the adapter collar, with the acetone-filled cap, down against the fiber washer on the shoulder of the fuze case. The air hole is pointed upward to permit the air to escape without the acetone leaking out. It is sealed off when the adapter collar is tight on the fiber washer.

(3) Secure the percussion-cap-and-detonator assembly to the base of the fuze with the retaining collar.

(4) Screw the fuze into the charge.

e. Neutralizing. Once the fuze is armed, there is no way to stop the chemical action. The fuze should be destroyed in place along with the attached charge. If it is necessary to neutralize the fuze, unscrew it from the charge and remove the percussion-cap-and-detonator assembly by unscrewing the retaining collar.

Caution: Moving or jarring the fuze might complete the deterioration of the partially dissolved celluloid washer.

72. Italian Special Chemical Delay Fuze

a. Description. The Italian special chemical delay fuze (fig. 92) is of the delay, mechanical type and contains a spring-loaded striker with a celluloid-washer release. The cylindrical metal case is internally threaded at the top to receive a plug which closes the reaction chamber. A leather washer is provided between the cylindrical metal case and the striker housing to seal the joint. The spring-loaded striker is held against the housing by a cap screw that is screwed into the striker shaft. The striker housing is screwed into the bottom of the cylindrical case. The base of the striker housing is threaded for taking a retaining collar that holds a percussion cap. The retaining collar is externally threaded for screwing the fuze into the charge. The top of the fuze is ¾ inch in diameter, and the over-all length, with the plug and the retaining collar, is 2¼ inches. The chemical to dissolve the celluloid washer is carried separate from the fuze in a small bottle.

b. Employment. This fuze is used for the delayed detonation of charges.

c. Functioning. With the reaction chamber filled with chemical, the celluloid washer is dissolved, releasing the spring-loaded striker against the percussion cap.

d. Installing and Arming.

(1) Screw the retaining collar, with percussion cap, to the base of the fuze.

(2) Screw the fuze, with detonator, into the charge.

(3) Unscrew the plug on the top of the fuze and fill the reaction chamber with the chemical provided. Replace the plug.

e. Neutralizing. Once the fuze is armed, there is no way to stop the chemical action. The fuze should be destroyed in place along with the attached charge. If it is necessary to neutralize the fuze, unscrew it from the charge and remove the percussion cap and the detonator.

Caution: Moving or jarring the fuze might complete the deterioration of the partially dissolved celluloid washer.

73. Italian Naval Clockwork Delay Fuze

a. Description. The Italian naval clockwork delay fuze (fig. 93) is of the delay, mechanical type with an electrical contact circuit closer and an integral booster and main charge. The fuze is divided into two compartments. The upper compartment, 11½ inches in diameter, contains an electric clockwork mechanism that can be set for a delay of up to 50 days; two batteries; and the actuating mechanism (fig. 94) consisting of a time-setting disk with a recess at the 50 mark, a lever arm with a metal pointer along one side, and two contacts that are wired into a series circuit with the batteries and an electric detonator. One of the contacts is fixed in place. The other contact is attached to one end of the lever arm. The other end of the lever arm is hinged. The metal pointer, which is near the hinged end, is made to bear against the time-setting disk by an actuating spring that is fastened to the lever arm near the contact end. The lower compartment, 14¾ inches in diameter, contains the electric detonator, a booster charge, and a main charge of 28 pounds of explosive.

b. Employment. This fuze, with its integral main charge, is used chiefly in the destruction of harbor facilities. The depth charges are placed in the water near shipping berths. One fuze contains enough explosive to detonate a group of depth charges.

c. Functioning. As viewed from above, the time-setting disk rotates with the clockwork mechanism in a counterclockwise direction. When the recess at the 50 mark reaches the metal pointer,

the actuating spring pulls the pointer into the recess, pivoting the lever arm about the hinged end and bringing the contacts together, closing the circuit and firing the electric detonator, the booster charge, and the main charge.

d. Installing and arming.

(1) Remove the upper compartment cover.

(2) Insert the two batteries and the electric detonator.

(3) Set the clockwork mechanism for the desired delay in days by turning the time-setting disk until the metal pointer is opposite the proper mark.

(4) Be sure the contacts are apart. Connect

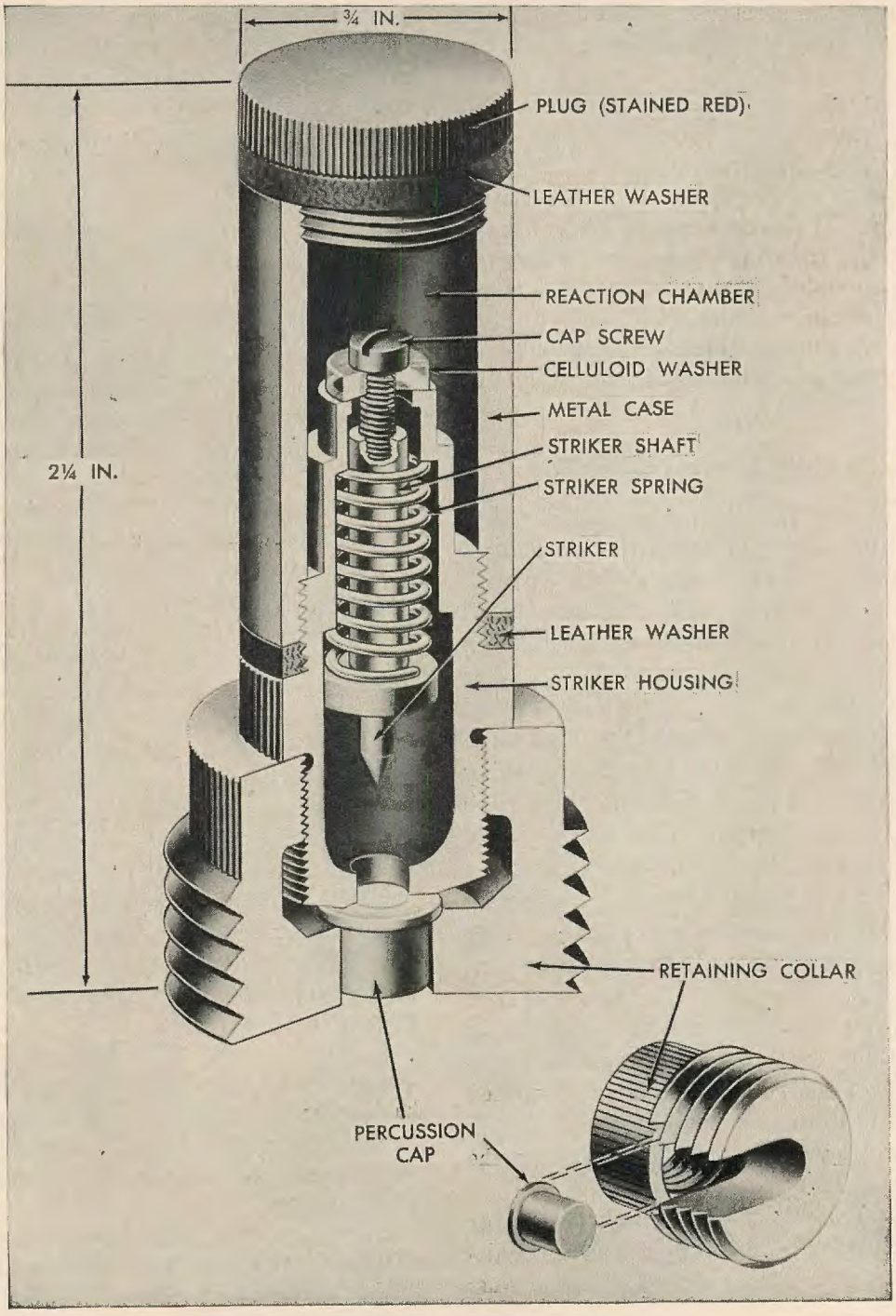


Figure 92. Italian special chemical delay fuze.

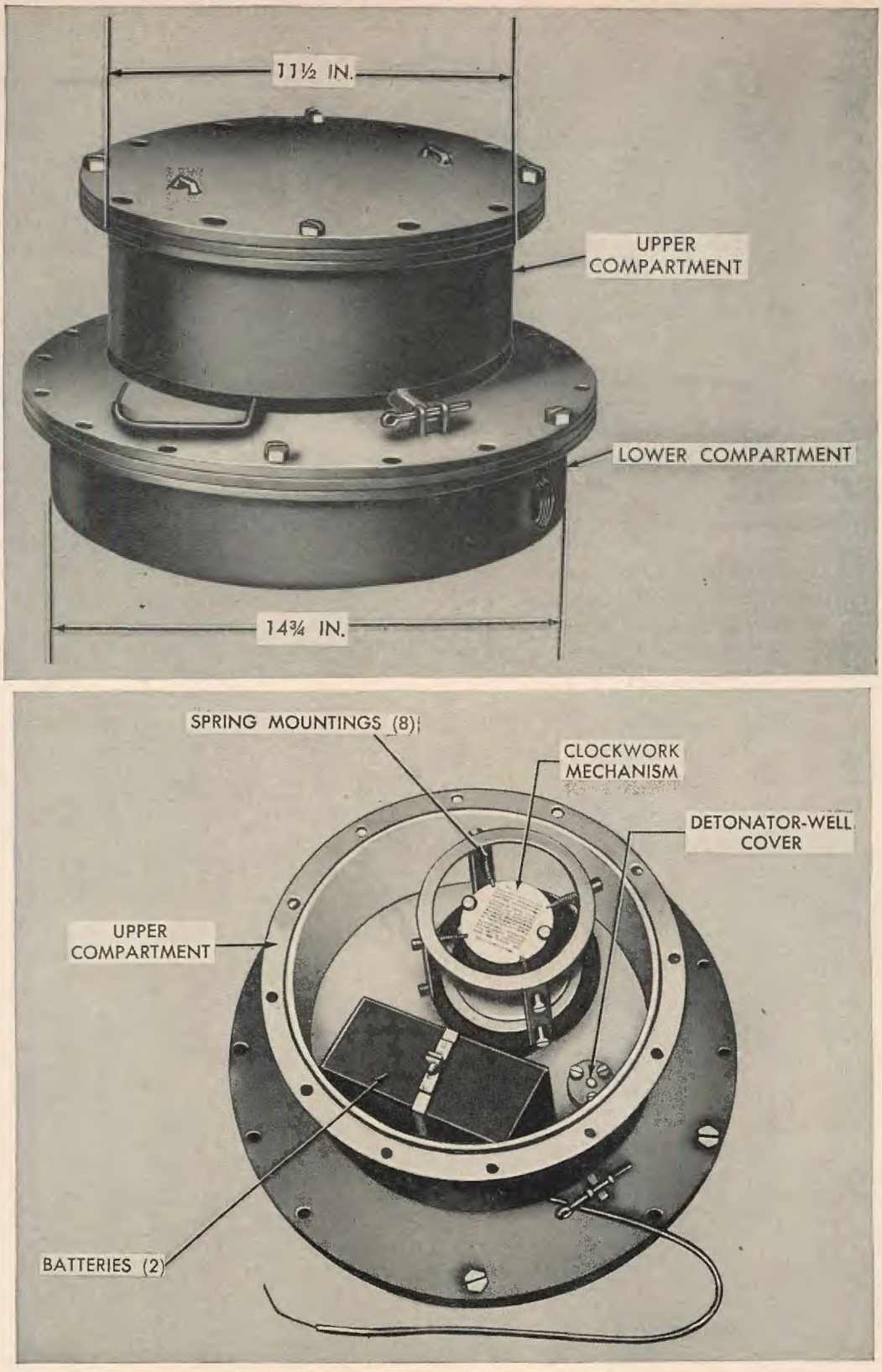


Figure 93. Italian naval clockwork delay fuze.

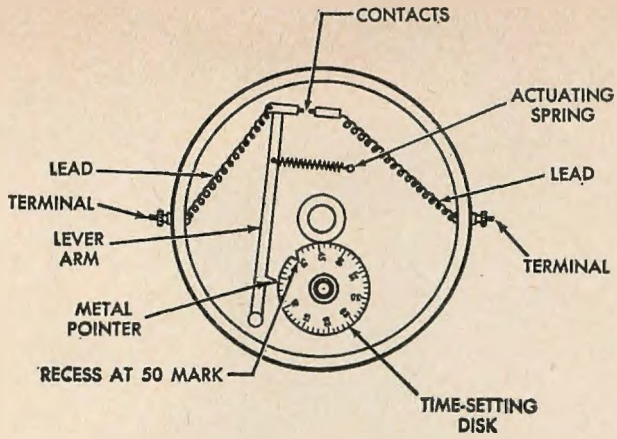


Figure 94. Actuating mechanism of Italian naval clockwork delay fuze.

the terminals of the clockwork mechanism in series with the batteries and the electric detonator.

(5) Replace the cover.

Note. The time required for the clock to move through one division on the time-setting disk may be as little as 20 hours. Accurate settings will require a trial run of the clock prior to actual use.

e. Neutralizing.

(1) Remove the upper compartment cover.
(2) Disconnect all the electric leads.
(3) Remove the electric detonator and the batteries.
(4) Replace the cover.

Chapter 13

MINES AND MINE DETECTING EQUIPMENT

Section I. ANTITANK MINES

74. Italian B–2 Antitank Mine (Metallic)

a. Description. The Italian B–2 antitank mine (metallic) (figs. 95 and 96) consists of a welded sheet-steel case, 42 inches long, 5 inches wide, and 5 inches high, with a removable pressure cover. It is the same mine as the Spanish B–2 antitank mine (TM 5–223B). The fuze, which is horizontal, consists of a cylindrical brass case, one end containing a spring-loaded striker, and the other end a double-ended detonator. Between the striker and the detonator is a space for inserting a percussion-cap holder. The striker is held in a cocked position by a copper wire and a striker-retaining pin. One end of the wire is tied to the end of the striker shaft projecting from the case. The wire then passes through a cutter guide and is tied to the eye of an adjusting bolt inserted through a bracket. By means of an adjusting nut, the striker can be drawn into a cocked position. On the side of the fuze case is a bracket with a lever pivoted at its top so as to move in a vertical plane. One end of the lever is positioned over an opening in the top of the horizontal fuze case. Attached to this end of the lever is the striker-retaining pin, which drops down in front of the shoulder on the striker shaft when the striker is in the cocked position. The other end of the lever projects through an opening in the side of the mine case. A leaf spring bears against the lever so as to hold the striker-retaining pin down in the fuze case. A safety pin is inserted, through openings in the pressure cover and the mine case, into the fuze case in front of the shoulder on the striker shaft. A spool of cord is provided for withdrawing the safety pin from a safe distance. Attached to the outer end of the double-ended detonator is a length of detonating cord that is tied to another length of detonating cord that connects two detonators inserted in 3.5-pound wooden-encased charges at each end of the mine case. These two 3.5-pound charges constitute the main charge. The pressure cover is supported by two coil springs in the mine case, and is fastened to the case at each end by small chains. Two tubes attached to the underside of the cover fit into the springs and serve as guides. A cutter attached to the underside of the cover is positioned directly over the cutter guide. The cover has two hinged lids. One lid provides access to the fuze, and the other lid provides access to the adjusting nut used for cocking the striker. The mine weighs a total of 33 pounds, including the 7-pound main charge.

b. Employment. This mine is usually employed in road blocks and at road junctions because of its large area of coverage. It should be installed with at least a 2-yard interval between mines to prevent sympathetic detonation.

c. Functioning.

(1) A pressure of 300 pounds, or more, on the pressure cover forces the cover downward against the resistance of the two coil springs in the mine case.

(2) The edge of the cover presses down on the end of the striker-retaining-pin lever, lifting the striker-retaining pin from the opening in the fuze case.

(3) The cutter is forced into the cutter guide where it shears the striker-retaining wire, releasing the spring-loaded striker against the percussion cap, firing the double-ended detonator, the detonating cord, the two detonators in the main charge, and the main charge.

d. Installing and Arming.

(1) Place the mine in a hole so the pressure cover is flush with the surface of the ground.

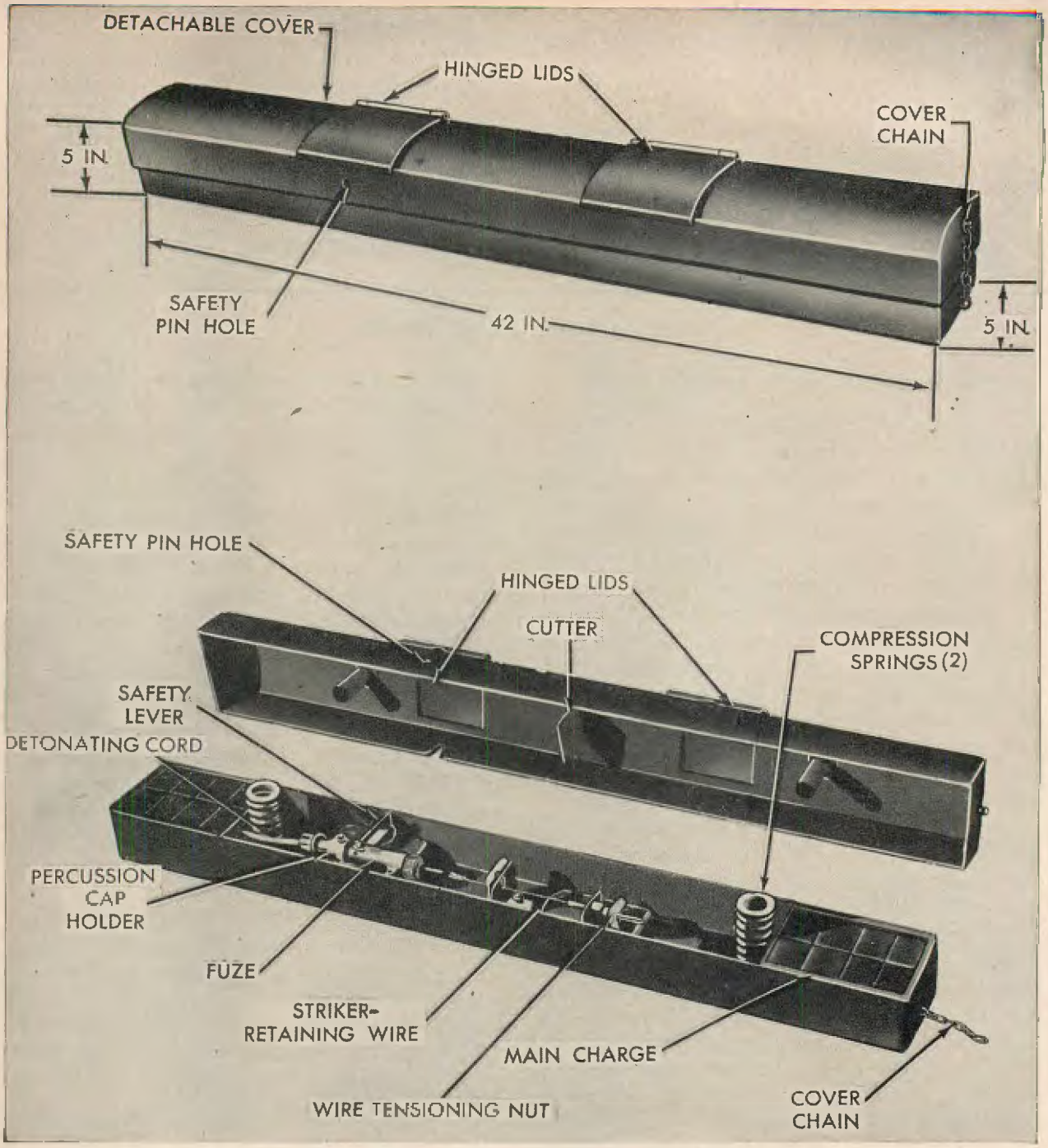


Figure 95. Italian B–2 antitank mine (metallic).

(2) Remove the pressure cover.
(3) Connect the two detonators for the main charge with detonating cord and insert the detonators in the charges at each end of the mine.
(4) Pass the detonating cord through the threaded collar that holds the double-ended detonator in the fuze case; then crimp the detonating cord to the double-ended detonator.
(5) Insert the double-ended detonator in the fuze case and screw on the threaded collar.
(6) Tie the detonating cord crimped to the double-ended detonator to the other detonating cord.

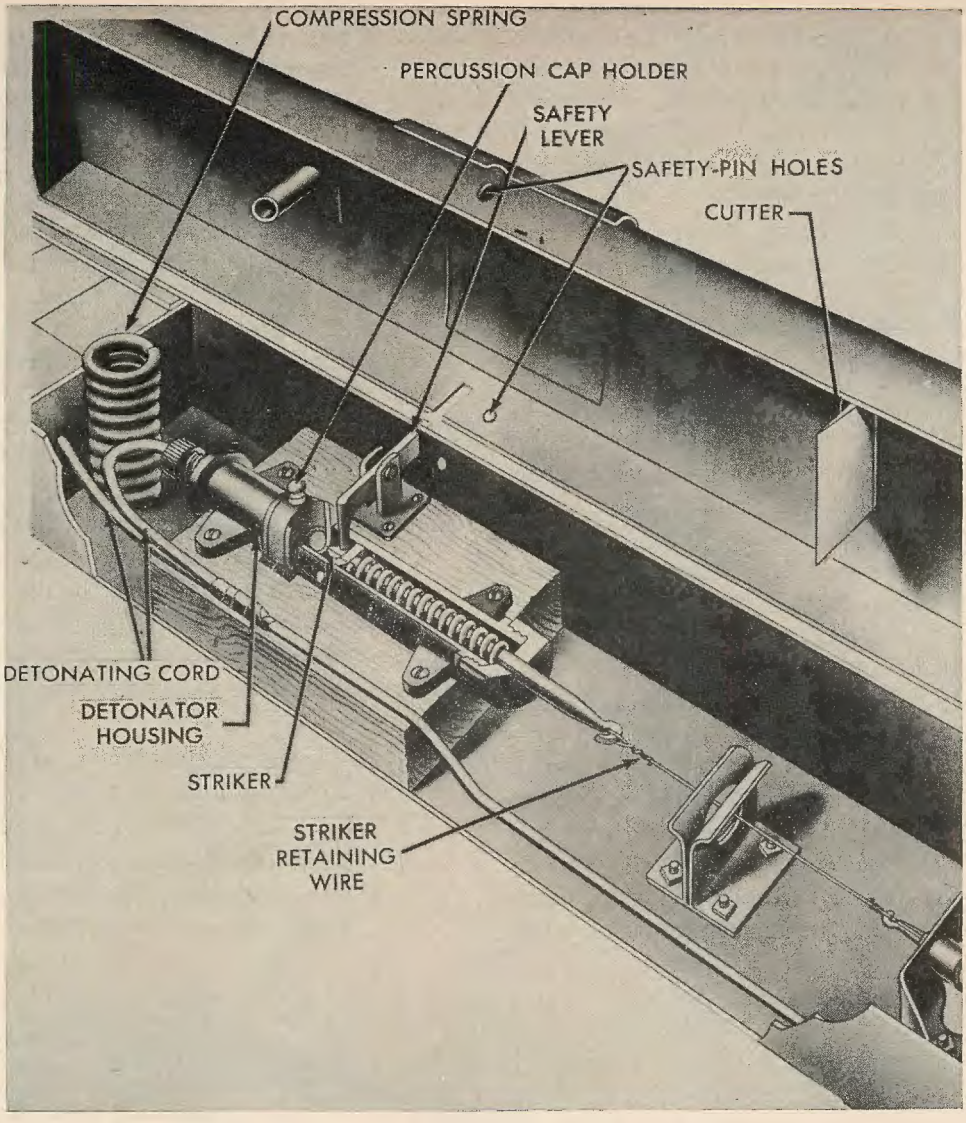


Figure 96. Actuating mechanism of the B–2 antitank mine.

(7) Replace the pressure cover and fasten it to the mine case at each end by the small chains provided.

(8) Open the two hinged lids on the pressure cover.

(9) Cock the striker by lifting up the striker-retaining pin with one hand while turning the adjusting nut with the other hand until the shoulder on the striker shaft is drawn just past the opening in the top of the fuze case; then let the striker-retaining pin drop down into the opening.

(10) Insert the safety pin through the openings in the pressure cover and the mine case.

(11) Insert the percussion-cap holder, with percussion cap, in the space in the fuze case between the striker and the detonator.

(12) Close the hinged lids.

(13) Withdraw the safety pin from a safe distance, using the spool of cord provided.

e. Neutralizing.

(1) Uncover the mine. Attach a 50-yard length of wire or rope to both hinged lids and pull the lids open from a covered position.

(2) Insert a stout wire through the safety-pin holes in the pressure cover and the mine case.

(3) Pull out the percussion-cap holder.
(4) Withdraw the safety wire and uncock the striker by lifting up the striker-retaining pin with one hand while turning the adjusting nut with the other hand until there is no longer any tension in the striker-retaining wire.
(5) Remove the pressure cover.
(6) Remove the three detonators.

75. Italian B–2 Antitank Mine (Wooden)

a. Description. The Italian B–2 antitank mine (wooden) (fig. 97) consists of a wooden case, 34½ inches long, 7½ inches wide, and 8½ inches high, with a hinged pressure lid. An E-shaped bracket supports the spring-loaded striker. The striker spring is compressed between a shoulder on the striker shaft and a leg of the bracket. A striker-retaining wire connects the end of the striker shaft to an adjusting bolt running through one end of the wooden case. On the outside of the case is an adjusting nut that screws onto the adjusting bolt so the striker can be drawn into a cocked position. The striker-retaining wire passes over a wooden block. Fastened to the underside of the pressure lid and positioned directly over the wooden block is a cutter for cutting the striker-retaining wire. At the other end of the wooden case is a compartment for the main charge. The detonator is inserted in the charge through a leg of the E-shaped bracket and a wooden partition. The percussion cap is supported by the hole in the same leg of the bracket. At each end of the case is a coil spring for supporting the pressure lid. Fastened to the underside of the lid and positioned directly over the two springs are wooden plugs that fit into the springs and serve as guides. The coil springs hold the pressure lid partly open so the cutter does not rest on the striker-retaining wire. A hook in the lid and a nail in the wooden case are wired together as shown in figure 97.

b. Employment. This mine is usually employed in road blocks and at road junctions because of its large area of coverage. It should be installed with at least a 2-yard interval between mines to prevent sympathetic detonation.

c. Functioning. Pressure on the pressure lid forces the lid to close against the resistance of the two coil springs, forcing the cutter to cut the striker-retaining wire, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.
(1) Place the mine in a hole so the pressure lid is flush with the surface of the ground.
(2) Insert the detonator and the percussion cap in the charge through the leg of the E-shaped bracket and the wooden par-

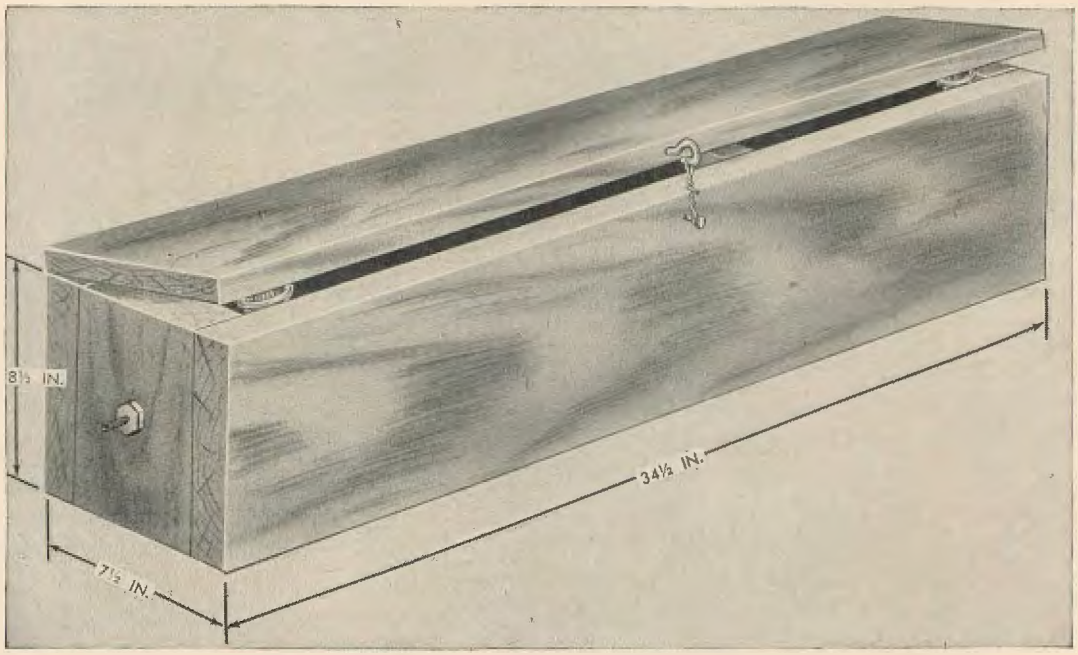


Figure 97. Italian B–2 antitank mine (wooden).

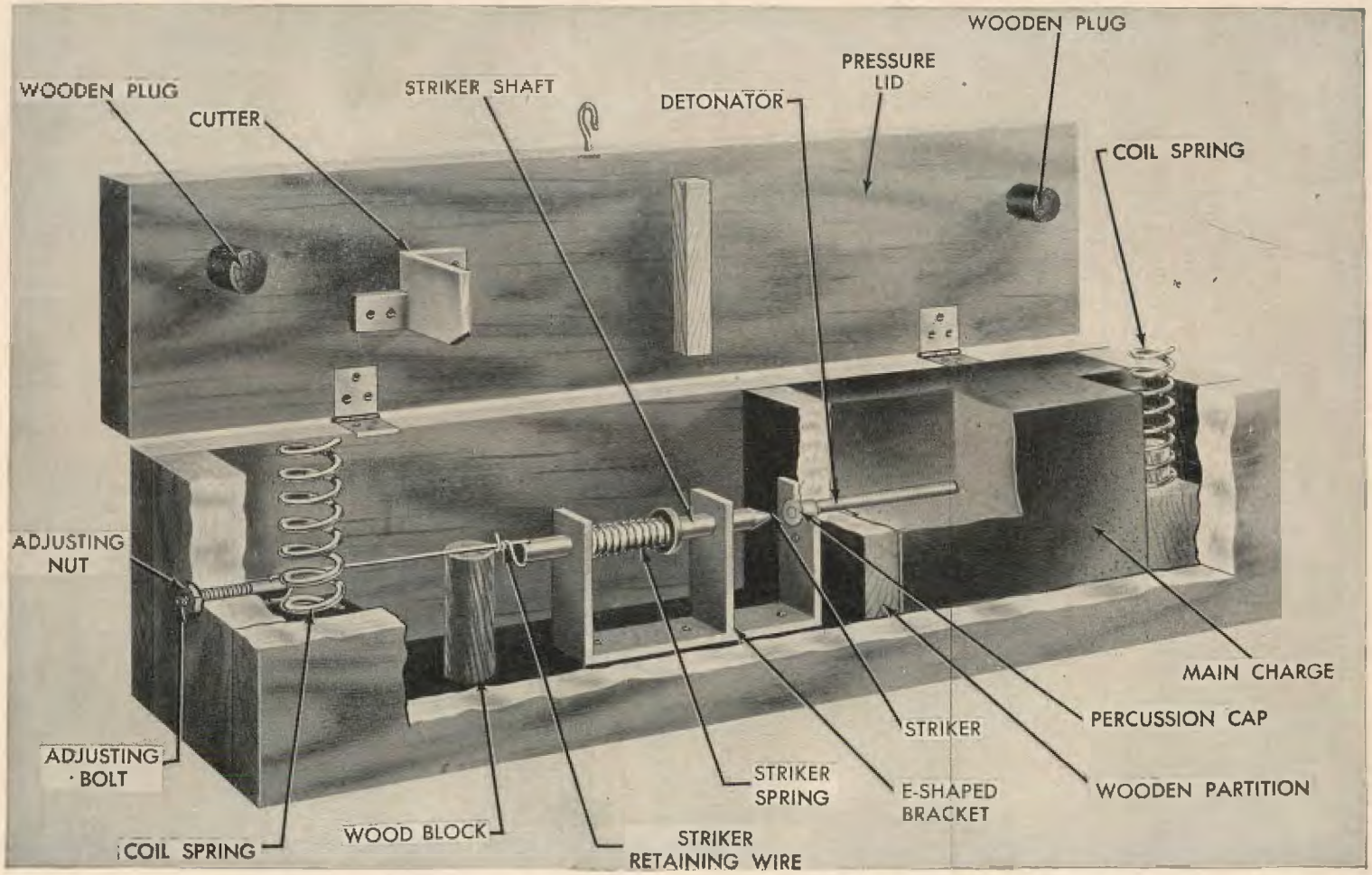


Figure 97—Continued.

tition; the percussion cap will rest in the leg of the bracket.

(3) Draw the striker into the cocked position by means of the adjusting nut on the outside of the case. For safety during this operation, a flat piece of metal may be placed between the striker and the percussion cap in the event the striker-retaining wire should fail accidently.

(4) Let the pressure lid down on the coil springs; it should not close all the way. Wire the lid to the case as shown in figure 97.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.

(2) Open the pressure lid. Do not force it; it should open easily.

(3) Place a heavy strip of metal between the striker and the percussion cap.

(4) Remove the percussion cap and the detonator.

(5) Uncock the striker by means of the adjusting nut until there is no longer any tension in the striker-retaining wire.

76. Italian V–3 or N5 Antitank Mine

a. Description. The Italian V–3 or N5 antitank mine (fig. 98) consists of a sheet-metal case with a removable pressure cover. The mine is 45 inches long, 2½ inches wide, and 2¾ inches high. It weighs a total of 17 pounds, including 6 pounds of explosive. A built-in fuze with a spring-loaded striker is located at each end of the mine. The main charge is located between the two fuzes. The striker spring is compressed between the front shoulder and a threaded collar in which the striker shaft rides. On the other side of the collar is the rear shoulder. Crimped over this shoulder is a cocking tube with a handle on the end for pulling the striker into the cocked position. When the striker is in the cocked position and the cocking tube is pushed back in, a safety-pin hole in the end of the striker shaft is exposed. The striker is retained in the cocked position by a striker-retaining pin on the end of a flat retaining spring. Surrounding the fuze case and resting on the retaining spring is a U-shaped spring clip. An actuating pin inserted through the side of the mine case rests on the top of the U-shaped spring clip. The two fuze compartments are completely metal incased. In the top of the casing, positioned over the open part of the U-shaped spring clip, is a plunger, which is held to the pressure cover by a concave-shaped nut. On the under side of the pressure cover is a pressure-adjustment nut for adjusting the actuating pressure by varying the amount of compression in a coil spring held between the pressure-adjustment nut and the top of the fuze-compartment casing. A cutter guide is attached to the top of the casing directly below a cutter on the under side of the pressure cover. A copper pin can be inserted in the cutter guide to increase the actuating pressure. The actuating pressure varies from as little as 22 pounds, with neither the copper pin nor the pressure-adjustment nut used in either fuze, to as much as 264 pounds with both copper pins in place and both pressure-adjustment nuts screwed all the way down. In the fuze case, just forward of the striker, is a space for inserting the percussion-cap holder, which is held in place by a spring catch that engages in a notch in the side of the holder. In the forward end of the fuze case is a well for the detonator.

b. Employment. This mine is usually employed in road blocks and at road junctions because of its large area of coverage. It should be installed with at least a 2-yard interval between mines to prevent sympathetic detonation. This mine also may be used as an antipersonnel mine by leaving out the copper pins in the cutter guides.

c. Functioning.

(1) Pressure on the pressure cover forces the cover downward, causing the cutter, for one or both fuzes, to cut the copper pin in the cutter guide.

(2) The plunger in one or both fuzes is depressed, against the resistance of the coil spring, onto the actuating pin. The actuating pin, in turn, depresses the U-shaped spring clip.

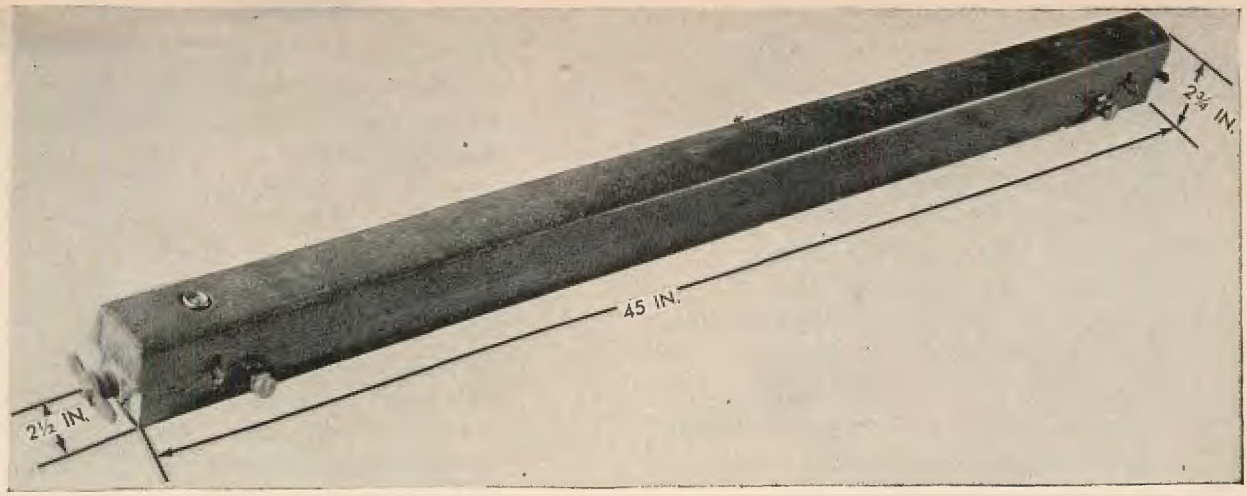
(3) The U-shaped spring clip depresses the striker-retaining-pin end of the flat retaining spring, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Withdraw the percussion-cap holders.

(2) Remove the pressure cover.

(3) Cock the striker of each fuze by pulling outward on the cocking tube while depressing the plunger sufficiently for the



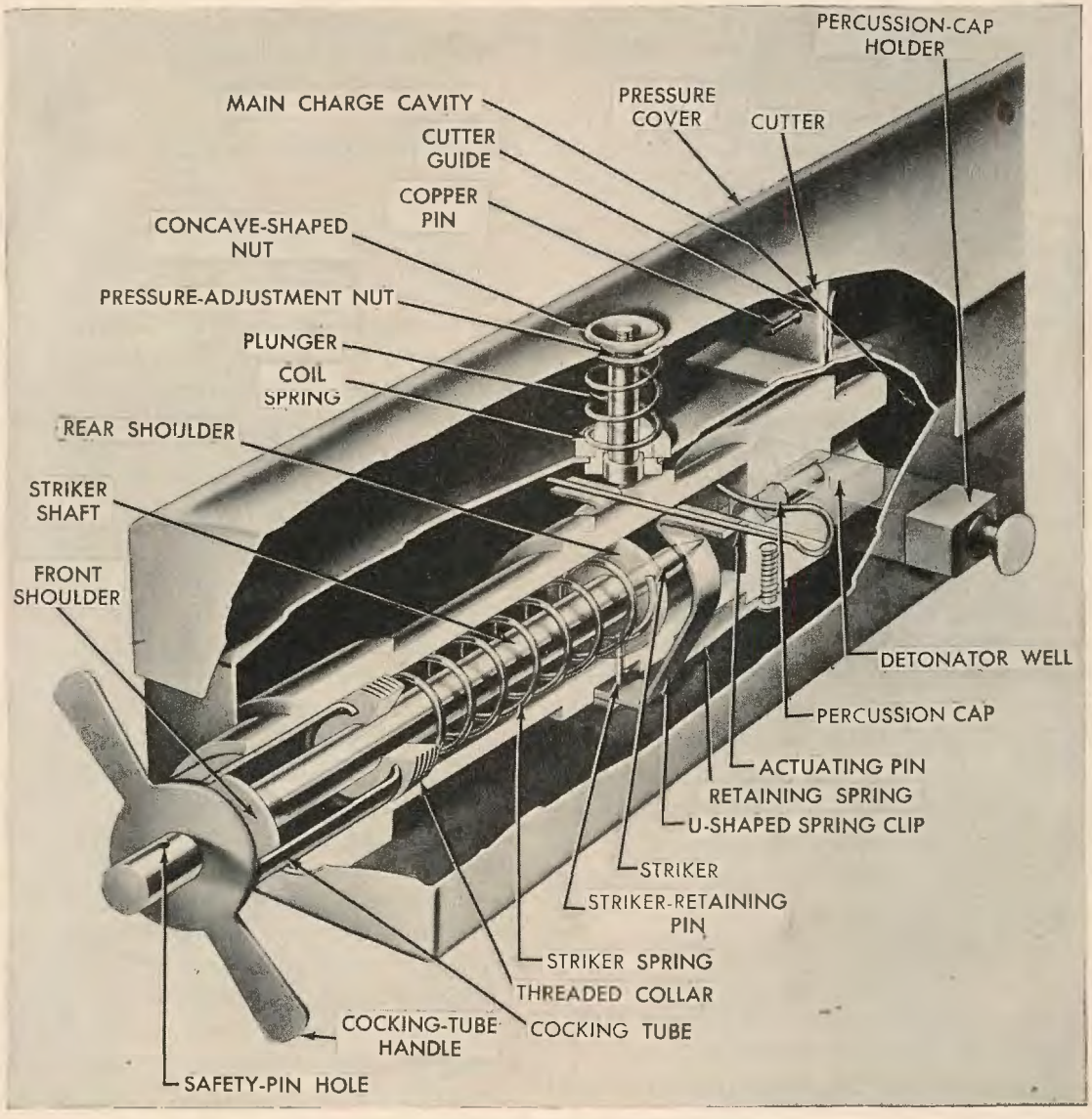


Figure 98. Italian V–3 or N5 antitank mine.

striker-retaining pin to clear the striker spring and the front shoulder on the striker shaft. When the shoulder is drawn past the striker-retaining pin, release the pressure on the plunger.

(4) Push each cocking tube all the way in and insert a safety pin in the safety-pin hole in the end of each striker shaft.

(5) Withdraw the actuating pins.

(6) Place the mine in a hole so the pressure cover will be flush with the surface of the ground.

(7) Insert the detonators, closed ends first, in the two end explosive blocks.

(8) Place the two explosive blocks with the detonators in the mine so the protruding ends of the detonators fit into the detonator wells in the ends of the fuzes.

(9) Adjust the actuating pressure by means of the pressure-adjustment nuts. Increasing the compression of the coil springs increases the actuating pressure.

(10) Insert the copper pins in the cutter guides.

(11) Place the pressure cover on the mine and tighten the concave-shaped nuts finger tight.

(12) Insert the percussion-cap holders, with percussion caps, in the openings provided in the side of the mine.

(13) Insert the actuating pins.

(14) Withdraw the safety pins.

Note. This mine may be used as an antipersonnel mine by omitting the copper pins in the cutter guides.

e. Neutralizing. This mine is extremely dangerous. Italians used it only when other mines were not available. From a covered position, remove the mine with a 50-yard length of wire or rope; or destroy it in place with hand-placed charges. If it is absolutely essential to neutralize the mine, proceed in the following manner:

(1) Examine the mine for trip wires and booby traps.

(2) Insert nails in the safety-pin holes in the ends of both striker shafts. If the holes are not visible, push in the cocking tubes until the holes are uncovered.

(3) Withdraw the actuating pins and the percussion-cap holders from the side of the mine.

(4) Carefully remove the pressure cover, keeping in mind that as little as 22 pounds pressure may actuate the mine.

(5) Remove the two end explosive blocks with the detonators.

(6) Remove the detonators from the explosive blocks.

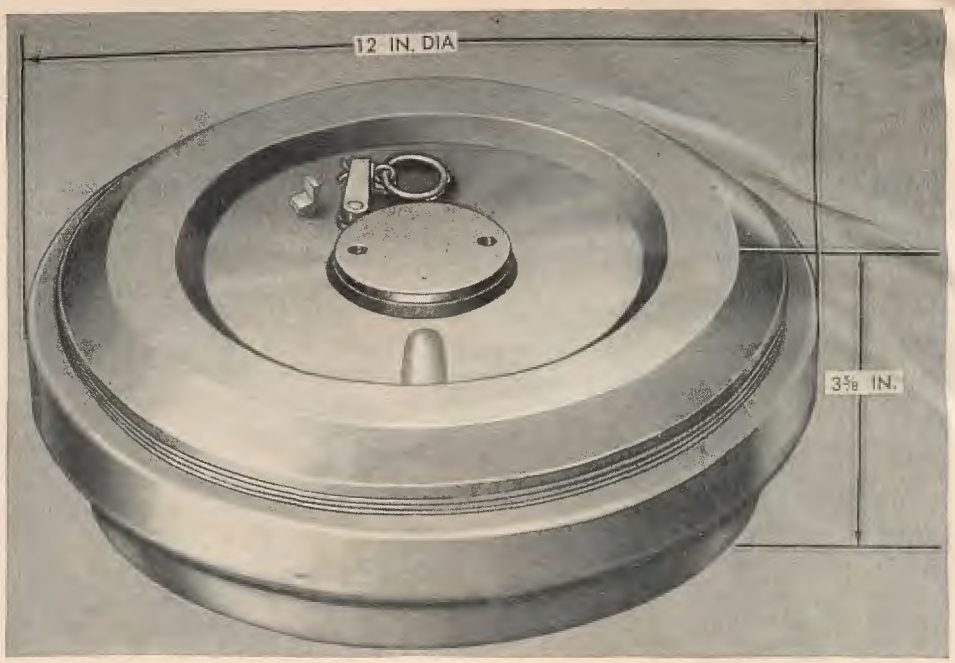
(7) Insert the actuating pins.

(8) Remove the nails in the safety-pin holes.

(9) Pull the cocking tube of each fuze outward and keep it in tension. While depressing the plunger sufficiently for the striker-retaining pin to clear the striker spring and the shoulder on the striker shaft, let the cocking tube and the spring-loaded striker ride slowly inward until there is no longer any compression in the striker spring.

77. Italian Type D Antitank Mine

a. Description. The Italian type D antitank mine (fig. 99) consists of a two-section steel case, 12 inches in diameter and 3⅝ inches high. The joint is made watertight by the lip of the cover compressing, by means of two coil pressure springs which support the cover, a packing piece placed in a slot in the lower section of the mine. A steel band protects the joint. Centrally located in the pressure cover is a threaded pressure plug. Centrally located in the lower section is the booster charge with a well for the detonator. A threaded plug in the bottom of the mine provides access to the detonator well. A base plate that covers the booster charge is part of the striker sleeve. The striker shaft is attached to the striker guide, which fits in the striker sleeve, to which it is held by two striker-retaining balls. An actuating plunger with a spherical-shaped head fits over the striker sleeve and holds the striker-retaining balls in place. The striker spring fits over the striker shaft and bears against the head of the actuating plunger. The safety device consists of a channel that fits into an opening in the side of the striker sleeve between the striker and the percussion cap. The channel slides back and forth in a track and is operated by a toggle coupled to an arming lever on the top of the pressure cover. The arming lever is free to move between two stops: an armed stop and a safe stop. The safe stop has a safety-pin hole in it through which the safety pin, of the cotter-pin type, is inserted and holds the arming



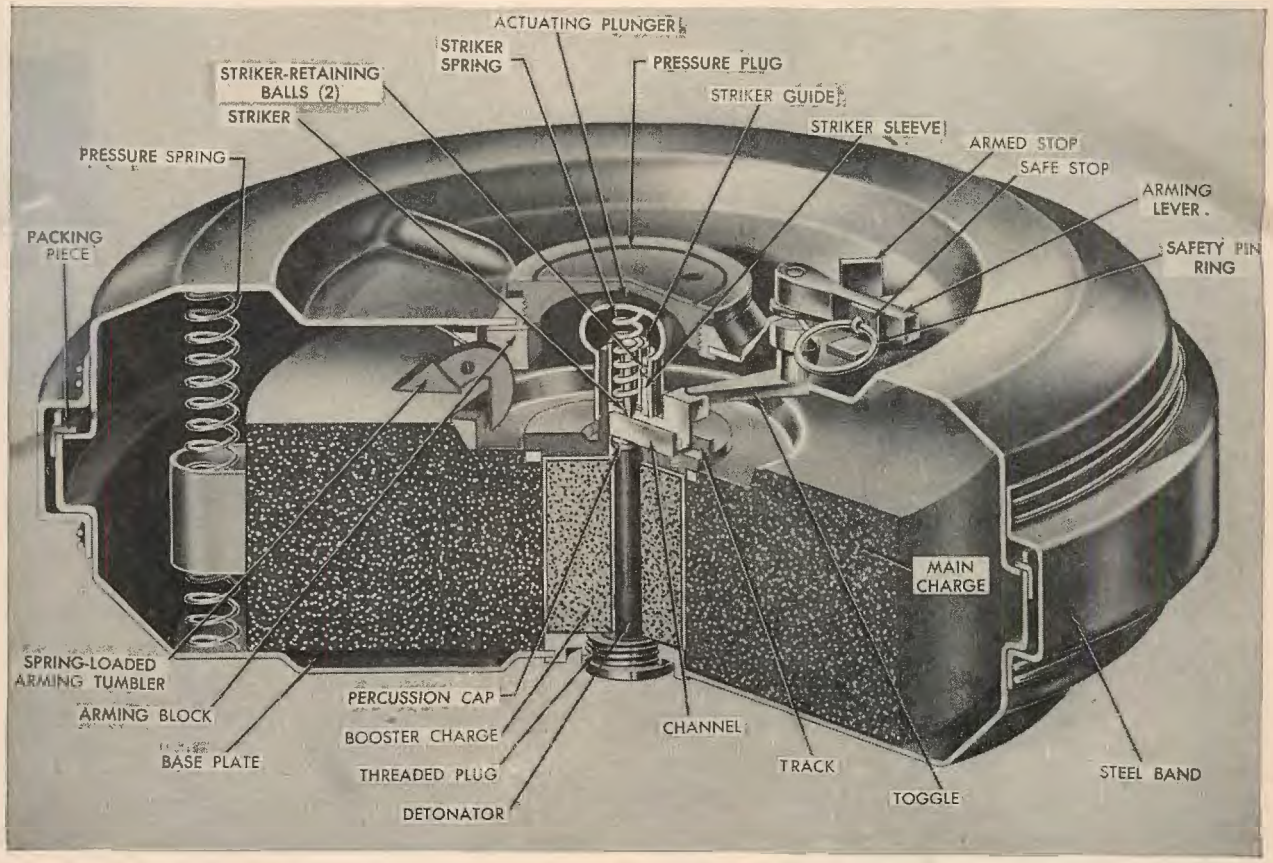


Figure 99. Italian type D antitank mine.

lever to the stop. This is the safe position with the channel between the striker and the percussion cap. Moving the arming lever to the armed stop arms the mine, by withdrawing the channel from the striker sleeve, and also causes the arming block to move away from the spring-loaded arming tumbler, which then rotates about its pivot, preventing the arming lever from being returned to the safe position.

b. Employment. This mine is employed in tactical mine fields that are part of a barrier plan. It is also used in road blocks and in offensive mine fields that are to be removed quickly.

c. Functioning. Pressure on the pressure cover compresses the two pressure springs and depresses the actuating plunger until the two striker-retaining balls escape into the spherical head of the plunger, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Unscrew the plug in the bottom of the mine and insert the percussion cap and the detonator. Replace the plug.

(2) Place the mine in a hole so the top of the mine will be flush with the surface of the ground.

(3) Remove the safety pin holding the arming lever to the safe stop and move the lever to the armed stop.

e. Neutralizing.

(1) Examine the mine for activating fuzes and antilifting devices.

(2) Lift the mine and remove the detonator and the percussion cap by unscrewing the plug in the bottom of the mine.

78. Italian Four-Fuze Antitank Mine

a. Description. The Italian four-fuze antitank mine (fig. 100) consists of a wooden case with a wooden pressure cover. It is 12¼ inches long, 10 inches wide, and 6¼ inches high, and it has a total weight of 14.25 pounds, including 11 pounds of explosive. The pressure cover consists of a frame that fits around the top of the mine case, as shown in figure 100, and a pressure board that rests on the tops of the four fuzes. The frame and the pressure board are fastened together by camouflage painted burlap which covers the entire pressure cover. Nailed to the top of the mine case is a cover board which overlaps the sides. Glued to the cover board is a locating board which locates the frame of the pressure cover and provides wells and storage recesses for the fuzes. The frame of the pressure cover is held to the cover board by four fasteners. A rope carrying handle is attached to the side of the mine case. Two different fuzes are available for use in this mine.

(1) *Friction fuze.* The friction fuze (fig. 101) consists of a cone-shaped bakelite case containing a paper cylinder filled with small angular pieces of hard limestone mixed with carbon, sulfur, and potassium chlorate. A bakelite lid is cemented onto the case. A projection on the bottom of the case is pressed into the open end of a detonator.

(2) *Percussion fuze.* The percussion fuze (fig. 101) consists of a bakelite case shaped somewhat like that of the friction fuze. The fuze contains a striker but no striker spring. The striker sleeve rests on the supporting cone. A bakelite lid is cemented onto the case. A percussion-cap-and-detonator holder screws into the bottom of the case.

b. Employment. Because of its wood construction and burlap cover, this mine is employed only in temporary mine fields which are to be removed after a short time. It should be installed with at least a 2-yard interval between mines to prevent sympathetic detonation.

c. Functioning.

(1) *When armed with friction fuzes.*

(*a*) A pressure of 100 pounds, or more, on the pressure cover crushes one or more of the fuzes.

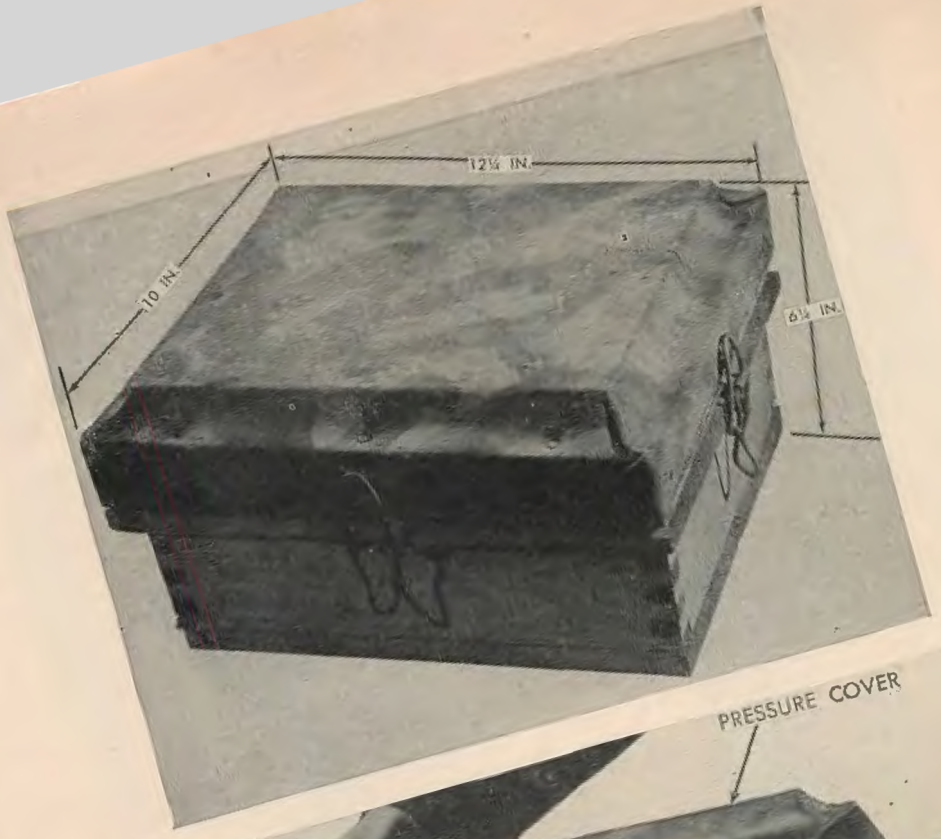
(*b*) Heat from the friction between the limestone and the chemical mixture produces a flame which fires the detonator and the main charge.

(2) *When armed with percussion fuzes.* Pressure on the pressure cover crushes the bakelite case of one or more of the fuzes and pushes the striker sleeve down over the supporting cone, forcing the striker into the percussion cap, firing the detonator and the main charge.

d. Installing and Arming.

(1) Remove the pressure cover.

(2) Place the mine in a hole so the pressure cover, when replaced, will be from 2 to 3 inches below the surface of the ground.



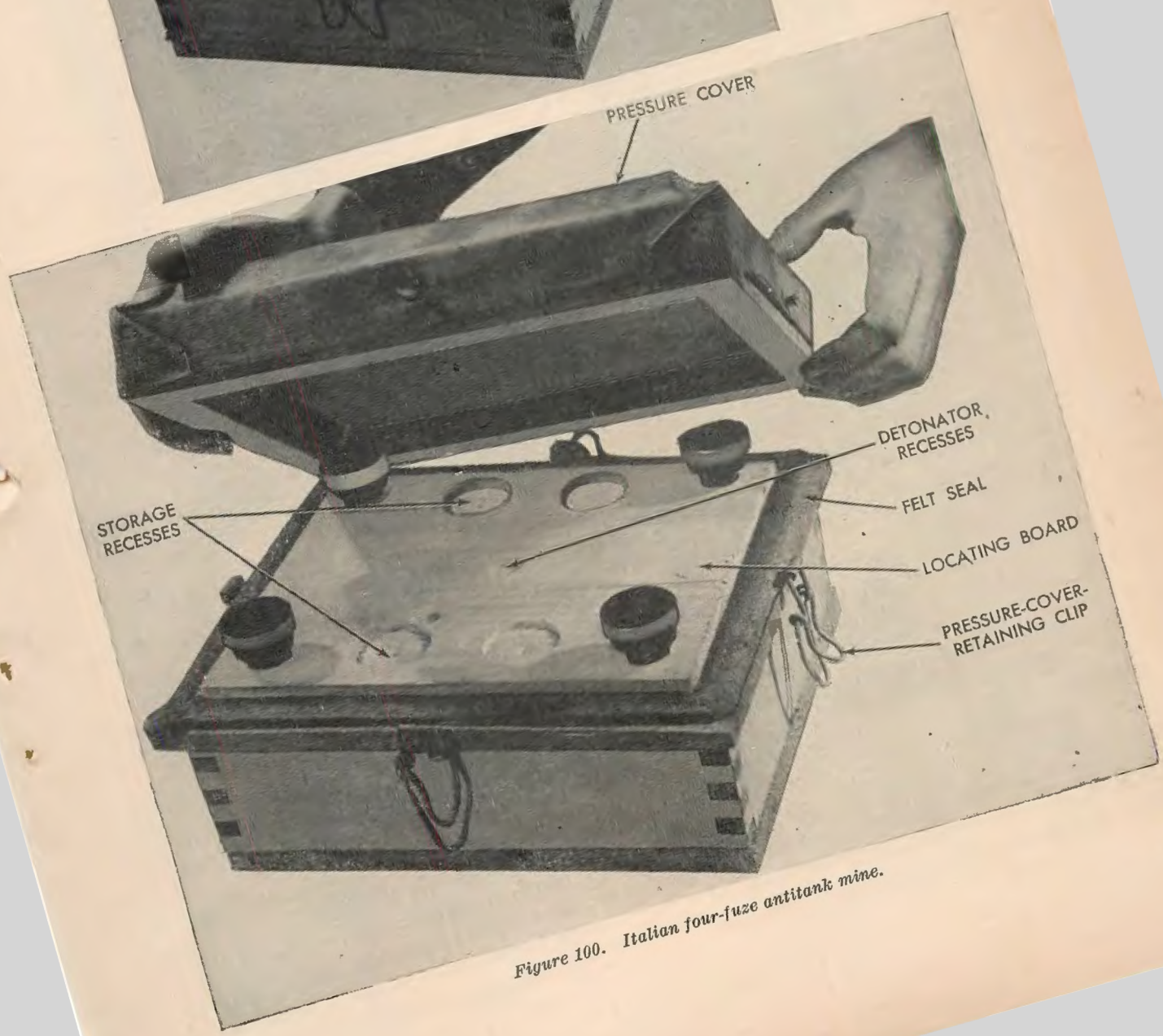


Figure 100. Italian four-fuze antitank mine.

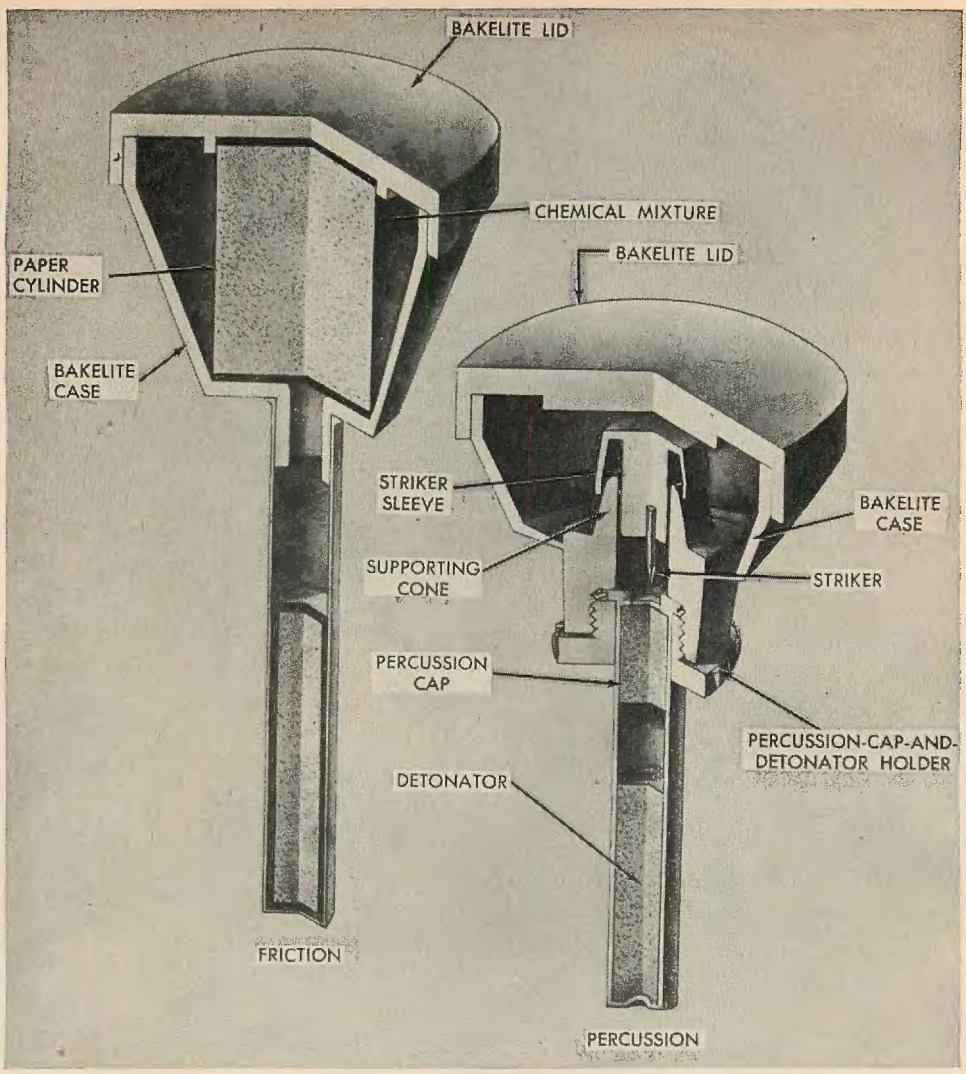


Figure 101. Fuzes used in Italian four-fuze antitank mine.

(3) Remove the four fuzes and the detonator block from their storage recesses in the locating board; remove the detonators from the block.

(4) If friction fuzes are used, press the projections on the bottoms of the bakelite cases into the open ends of the detonators. If percussion fuzes are used, attach the percussion cap and the detonator to the bottom of the bakelite case by means of the threaded percussion-cap-and-detonator holder.

(5) Remove the wooden shipping blocks from the fuze wells and insert the four fuzes.

(6) Replace the pressure cover and fasten it to the mine case by means of the four fasteners provided on the sides and the ends of the case.

e. Neutralizing. Avoid applying pressure on the pressure cover. If the mine appears to be deteriorated, or if it has been disturbed by blast or artillery fire, destroy it in place.

(1) Examine the mine for trip wires and booby traps.

(2) Release the fasteners and remove the pressure cover.

(3) Remove the four fuzes and detonators.

(4) Remove the percussion caps and the detonators from the percussion fuzes by unscrewing the percussion-cap-and-detonator holders. Do not attempt to remove the detonators from the friction fuzes.

f. Packing. For shipping, wooden shipping blocks are carried in the four fuze wells. The fuzes are carried upside down in four storage recesses in the locating board. The detonators are carried in a wooden block which has a plug on one side to fit into a recess in the center of the locating board.

Note. This mine was designed to avoid detection by electrical mine detectors. However, since the mine has some metal in it, the US SCR–625 detector will detect it, if it is not more than 6 inches below the surface of the ground.

79. Italian 9-Pound Antitank Mine

a. Description. The Italian 9-pound antitank mine (fig. 102) consists of a wooden case with a wooden pressure cover. It is 9½ inches long, 8 inches wide, and 5¼ inches high, and contains a main charge of 5.5 pounds of explosive. A wooden cover board with two fuze wells is nailed to the top of the mine case. Each fuze consists of an aluminum case with a shoulder and a tapered portion. The fuze contains a spring-loaded striker with a steel striker shaft. The striker spring is compressed between a shoulder on the striker shaft and a steel washer that is pressed into a recess in the top of the aluminum case. The striker is retained by a copper shear pin inserted through the striker shaft. The percussion cap is located just below the striker. The bottom of the fuze has a well for a detonator. The pressure cover rests on the pressure heads of the fuzes and is held in place by two wire handles.

b. Employment. This mine is used in road blocks and in antitank mine fields.

c. Functioning. A pressure of from 185 to 300 pounds on the pressure cover shears the copper shear pin in one or both of the fuzes, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Remove the pressure cover.
(2) Place the mine in a hole so the pressure cover, when replaced, will be from 2 to 3 inches below the surface of the ground.
(3) Remove the fuzes and insert a detonator in the base of each fuze.
(4) Insert the fuzes in the fuze wells.
(5) Replace the pressure cover and position the two wire handles over it.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.
(2) Remove the pressure cover.
(3) Remove the two fuzes and detonators.
(4) Remove the detonators from the fuzes.

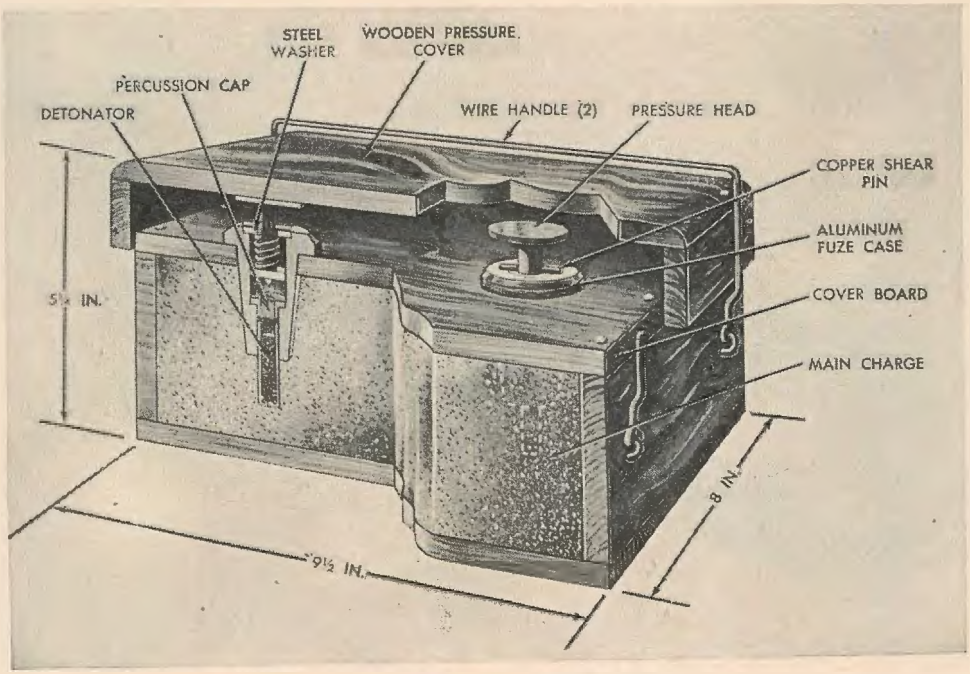


Figure 102. Italian 9-pound antitank mine.

80. Italian Type 9 Antitank Mine

a. Description. The Italian type 9 antitank mine (fig. 103) consists of a wooden case with a wooden pressure cover. It is 39 inches long, 9 inches wide, and 5¼ inches high, and weighs a total of 27.5 pounds, including a main charge of 12 pounds of explosive. At each end of the mine is a pressure fuze. Each fuze consists of two cylindrical cases that are locked together by a cam on the end of the striker case engaging in an internal groove in the end of the cartridge holder. A safety bar fits into a slot between the two cases. The striker case contains a spring-loaded striker. The end of the striker shaft is threaded to take an adjusting nut. One end of an actuating lever bears against the adjusting nut, retaining the striker. The midpoint of the actuating lever is pivoted on a bracket. The other end of the lever bears against a metal plate on the underside of the pressure cover. A pin is located in the lever-

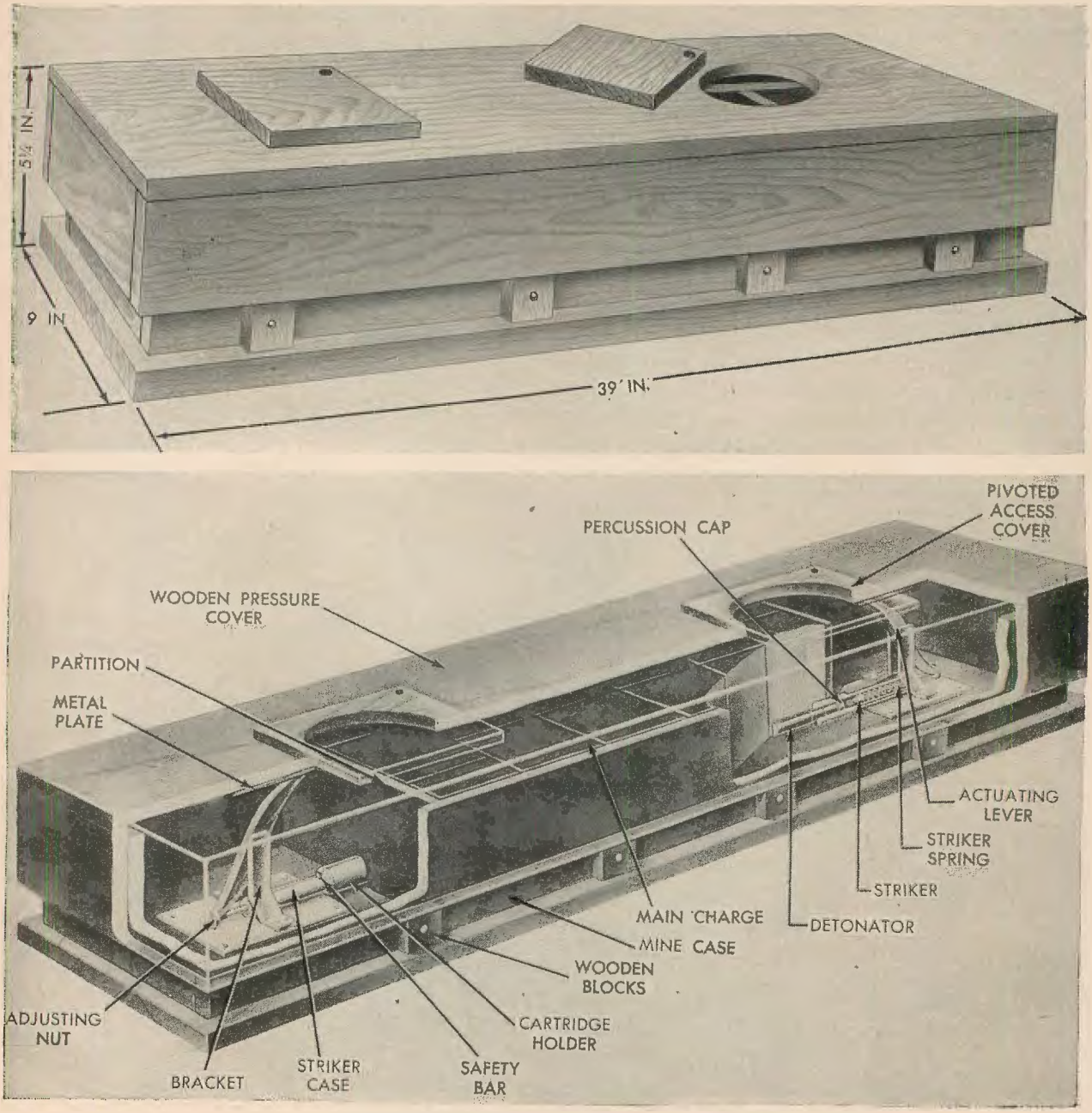


Figure 103. Italian type 9 antitank mine.

supporting bracket below the pivot point of the actuating lever to prevent the lever from rotating under the action of the spring-loaded striker when the pressure cover is removed. The cartridge holder contains a blank cartridge with a detonator inserted in its open end. The other end of the detonator is inserted in the end block of explosive. The main charge is located between the two fuzes and is separated from them by two wooden partitions. Two pivoted access covers in the pressure cover provide access to the safety bars. For antitank use, eight thin wooden blocks are fastened to the sides of the mine case between the overlapping sides of the pressure cover and the base of the case.

b. Employment. This mine is usually employed as an antitank mine in road blocks and at road junctions because of its large area of coverage. It may also be used as an antipersonnel mine. A minimum 2-yard interval must be provided between mines to prevent sympathetic detonation.

c. Functioning. Pressure on the pressure cover crushes the wooden blocks and rotates the actuating lever of one or both of the fuzes about its pivot, further compressing the striker spring until the lower end of the actuating lever trips the adjusting nut on the striker shaft, releasing the spring-loaded striker against the blank cartridge, firing the blank cartridge, the detonator, and the main charge. Without the wooden blocks, a pressure of from 20 to 40 pounds will actuate the mine.

d. Installing and Arming.

(1) Remove the pressure cover.
(2) Remove the blocks of explosive, and prepare holes in the two end blocks to receive detonators, as shown in figure 103.
(3) Insert the open end of a detonator in the blank cartridge of each fuze.
(4) Replace the blocks of explosive, end blocks first.
(5) Place the mine in a hole so the pressure cover, when replaced, will be flush with the surface of the ground or slightly below it.
(6) Replace the pressure cover.
(7) Open the two access covers and withdraw the two safety bars.
(8) Close the access covers.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.
(2) Open the access covers. If they are difficult to open, place wooden blocks, if none are already present, on each side of the mine between the base of the mine case and the overlapping sides of the pressure cover to prevent the cover from being depressed.
(3) Insert a small knife blade or similar strip of metal in the safety-bar slot of each fuze.
(4) Remove the pressure cover.
(5) Remove the blocks of explosive, end blocks last.
(6) Remove the detonators from the blank cartridges.
(7) Unlock the striker case from the cartridge holder by disengaging the cam on the end of the striker case from the internal groove in the end of the cartridge holder. A quarter of a turn on the striker case should disengage the cam.

81. Italian Type N Antitank Mine

a. Description. The Italian type N antitank mine (fig. 104) consists of a wooden case with a sheet-metal pressure cover. It is 15¾ inches long, 5½ inches wide, and 5 inches high, and weighs a total of 8 pounds, including a main charge of 5 pounds of explosive. The wooden mine case, which is bound with steel straps, contains, two metal tubes which hold percussion-cap-and-detonator assemblies. On the underside of the sheet-metal pressure cover is a wooden liner with two steel pressure plates attached to it. The two pressure plates rest on the heads of the two striker shafts, which are supported by two U-shaped springs, each of which is bound by a strand of piano wire. The striker shafts projects through the metal plate covering the wooden top of the mine case and extend down into the two metal tubes. Rope handles are provided on each end of the wooden case. The ends of the pressure cover have slots to clear the handles.

b. Employment. This mine is employed in hasty protective fields and is usually carried for unit security. A minimum 2-yard interval must be provided between mines to prevent sympathetic detonation.

c. Functioning. Pressure on the pressure cover snaps the strands of piano wire around the U-shaped springs and flattens the springs, forcing

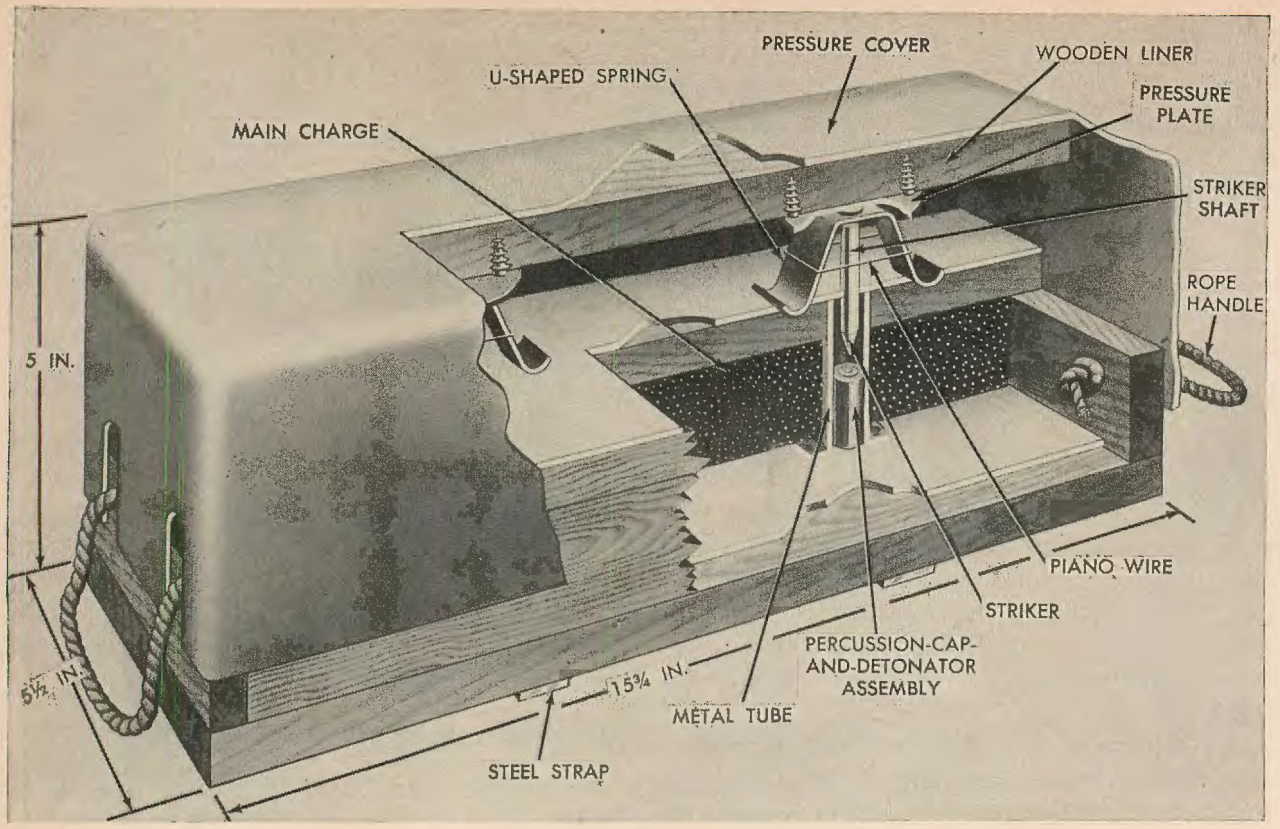


Figure 104. Italian type N antitank mine.

the strikers into the percussion caps, firing the detonators and the main charge.

d. Installing and Arming.

(1) Remove the pressure cover.

(2) Remove the metal plate covering the top of the mine case and insert the percussion-cap-and-detonator assemblies in the metal tubes.

(3) Replace the metal plate.

(4) Position the U-shaped springs over the holes in the metal plate so that the striker shafts extend down into the two metal tubes. See that the U-shaped springs are bound with piano wire.

(5) Place the mine in a hole so the pressure cover, when replaced, will be flush with the surface of the ground.

(6) Replace the pressure cover.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.

(2) Remove the pressure cover.

(3) Remove the U-shaped springs and strikers.

(4) Remove the metal plate covering the top of the mine case and remove the percussion-cap-and-detonator assemblies.

82. Italian Bakelite Antitank Mine, Type I

a. Description.

(1) *Mine.* The Italian bakelite antitank mine, type I (fig. 105), called the *Pignone* mine No. 1 by the Italians, consists of a bakelite case with a pressure plate that covers the entire case. The pressure plate bears on the top of the fuze assembly and is held in position by four steel wires which are looped through lugs, set at 90° around the mine, and fastened by plastic rivets. The space between the pressure plate and the top of the mine case is closed around the circumference by a strip of impregnated canvas. The mine case is in two sections. The two sections are assembled with a countersunk joint around the side and a spigotted joint on the bottom. The side joint has a rubber sealing ring and is made tight by

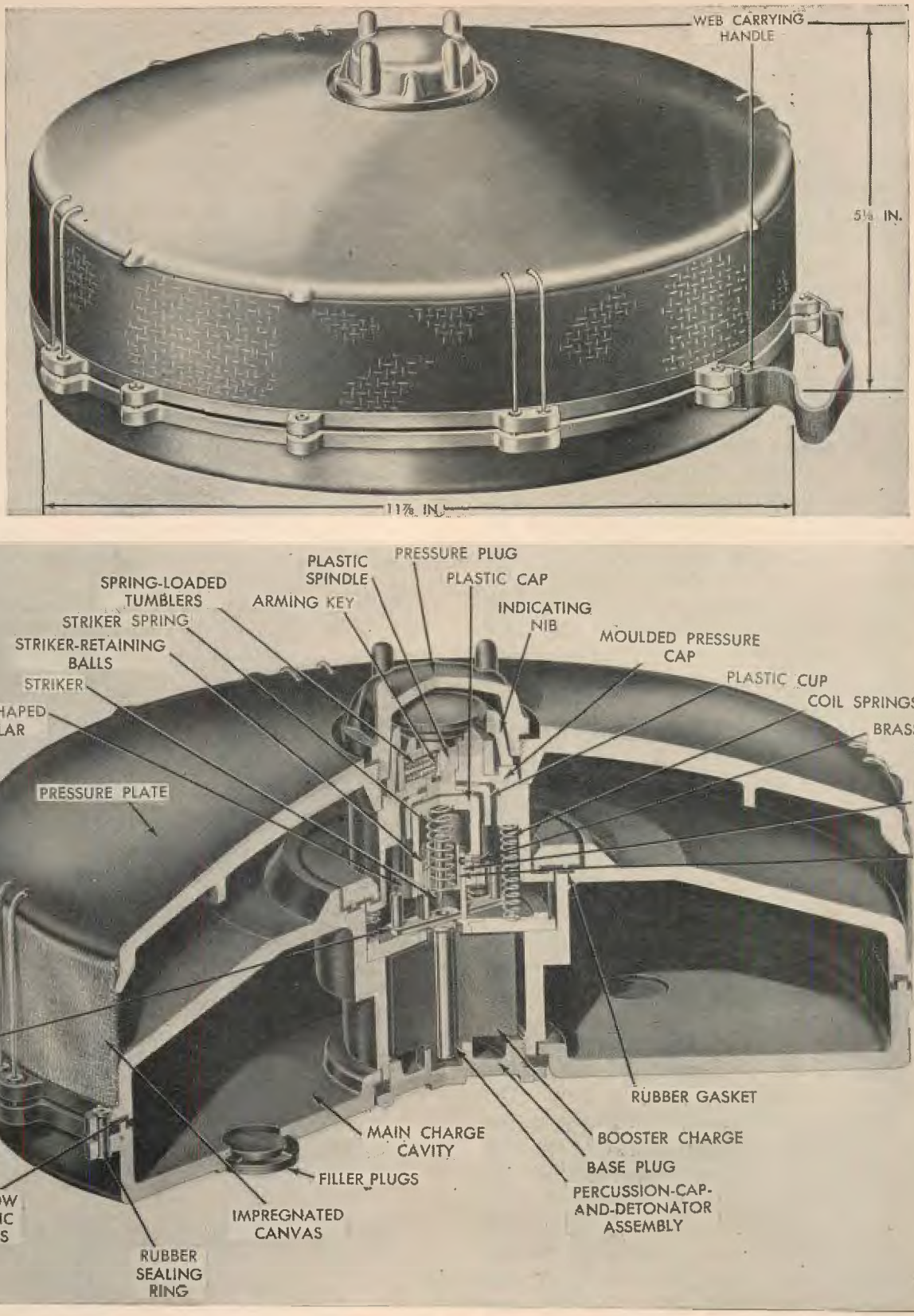


Figure 105. Italian bakelite antitank mine, type I.

hollow plastic rivets passing through eight pairs of lugs. The bottom joint is sealed by a rubber gasket, which is held in place by the flange of the threaded base plug. The base plug provides access to the booster charge and the percussion-cap-and-detonator assembly, which are located in the central chamber formed in the top section of the case. A web carrying handle is attached to the mine case by wire loops which pass through the hollow rivets in two pairs of lugs. Two filler plugs screw into holes in the bottom of the case. The mine is 11⅞ inches in diameter and 5⅛ inches high over all, and has a total weight of 13 pounds, including a main charge of 8 pounds of explosive.

(2) *Fuze.* The fuze consists of two main parts: the moulded base and the moulded pressure cap. They are held apart by nine coil springs. From the center of the base, a brass tube projects upwards and serves as a guide for the brass striker sleeve. A steel safety bar slides through the brass tube and separates the striker from the percussion cap in the unarmed position. In the armed position, a hole in the steel bar allows the striker to hit the percussion cap. The spring-loaded striker is held in the cocked position by two striker-retaining balls. These balls fit in a groove in the striker sleeve, and are held in place by a plastic cap which slides over the brass tube. This plastic cap is held in position by two horizontal brass shear pins which fit into the brass tube. Below the plastic cap is a double-cam-shaped collar, which controls the position of the safety bar. An added safety device consists of moulded projections which support the cam-shaped collar in the unarmed position. The position of the cam-shaped collar is controlled by an inverted plastic cup. This plastic cup has three slots which enable it to clear the moulded projections when in the armed position. A plastic spindle is keyed into the base of the plastic cup and projects through the center of the pressure cap. The plastic spindle takes a "Yale" type arming key which operates two spring-loaded tumblers which hold the plastic spindle in place. The key is of brass and is held in a bakelite knob, which is knurled at the edge and provided with an indicating nib as shown in figure 106. The nib swings between two projections on the pressure cap marked *S* (safe) and *A* (armed). A bakelite pressure plug screws into the center of the pressure plate and provides access to the arming key. The joint is sealed with a rubber gasket.

b. Employment. This mine is laid in areas being abandoned to the opposing force, because it is difficult to detect and neutralize.

c. Functioning.

(1) A pressure of 110 pounds applied to the pressure plate forces the upper part of the fuze assembly downward, compressing the mine coil springs and shearing the two brass shear pins.

(2) When the plastic cap has moved downward 3/16 of an inch, the two striker-retaining balls escape into the recess in the upper part of the plastic cap, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Unscrew the base plug, insert a percussion-cap-and-detonator assembly in the booster charge, insert the booster charge in the mine, and replace the base plug.

(2) Place the mine in a hole so the pressure plate will be flush with or slightly below the surface of the ground.

(3) Unscrew the pressure plug.

(4) Turn the arming key from *S* (*sicure:* safe) to *A* (*armato:* armed) and remove the key.

(5) Replace the pressure plug.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.

(2) Remove the mine from the hole.

(3) Unscrew the base plug and remove the booster charge.

(4) Remove the percussion-cap-and-detonator assembly from the booster charge.

Note. The fuze assembly is locked in the armed position and cannot be neutralized without the arming key.

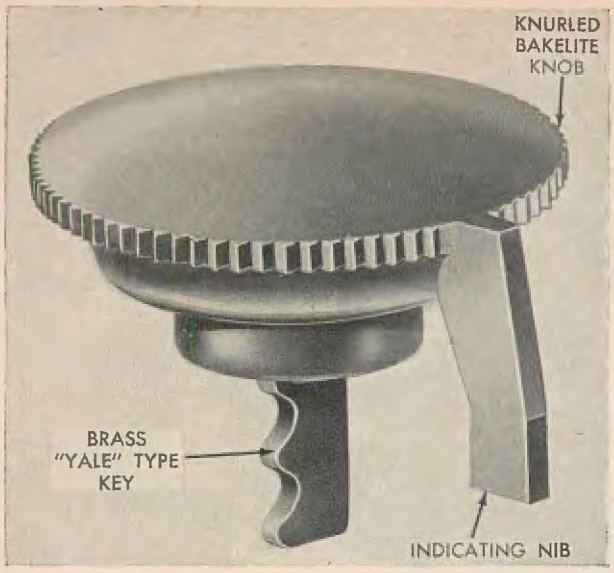


Figure 106. Arming key for the bakelite mines.

83. Italian Bakelite Antitank Mine, Type II

a. Description.

(1) *Mine.* The Italian bakelite antitank mine, type II (fig. 107), called the *Pignone* mine No. 2 by the Italians, consists of a bakelite case with a pressure plate 5½ inches in diameter. The pressure plate bears on top of the fuze assembly and is held in position by a locking collar which screws into a threaded socket in the top of the mine case. The fuze assembly is sealed off by two rubber gaskets, one where the pressure plate is held by the locking collar, and the other where the locking collar screws into the threaded socket. The mine case is in two sections. The two sections are assembled with a countersunk joint around the side and a spigotted joint on the bottom. The side joint has a rubber sealing ring and is made tight by hollow plastic rivets passing through twelve pairs of lugs. The bottom joint is sealed by a rubber gasket, which is held in place by the flange of the threaded base plug. The base plug provides access to the booster charge and the percussion-cap-and-detonator assembly, which are located in the central chamber formed in the top section of the case. A web carrying handle is attached to the mine case by wire loops which pass through the hollow rivets in two pairs of lugs. Two filler plugs screw into holes in the bottom of the case. The mine is 11⅞ inches in diameter and 5½ inches high over-all, and has a total weight of 13 pounds, including a main charge of 8 pounds of explosive.

(2) *Fuze.* This fuze is almost identical to the fuze in the bakelite antitank mine type I (par. 82) and further details on the fuze are contained in figure 105. The fuze consists of two main parts: the moulded base and the moulded pressure cap. They are held apart by nine coil springs. From the center of the base, a brass tube projects upwards and serves as a guide for the brass striker sleeve. A steel safety bar slides through the brass tube and separates the striker from the percussion cap in the unarmed position. In the armed position, a hole in the steel bar allows the striker to hit the percussion cap. The spring-loaded striker is held in the cocked position by two striker-retaining balls. These balls fit in a groove in the striker sleeve, and are held in place by a plastic cap which slides over the brass tube. This plastic cap is held in position by two horizontal brass shear pins which fit into the brass tube. Below the plastic cap is a double-cam-shaped collar, which controls the position of the safety bar. An added safety device consists of moulded projections which support the cam-shaped collar in the unarmed position. The position of the cam-shaped collar is controlled by an inverted plastic cup. This plastic cup has three slots which enable it to clear the moulded projections when in the armed position. A plastic spindle is keyed into the base of the plastic cup and projects through the center of the pressure cap. The plastic spindle takes a "Yale" type arming key which operates two spring-loaded tumblers which hold the plastic spindle in place. The key is of brass and is held in a bakelite arming knob, which is knurled at the edge and provided with an indicating nib as shown in figure 106. The nib swings between two projections on the pressure cap marked *S* (safe) and

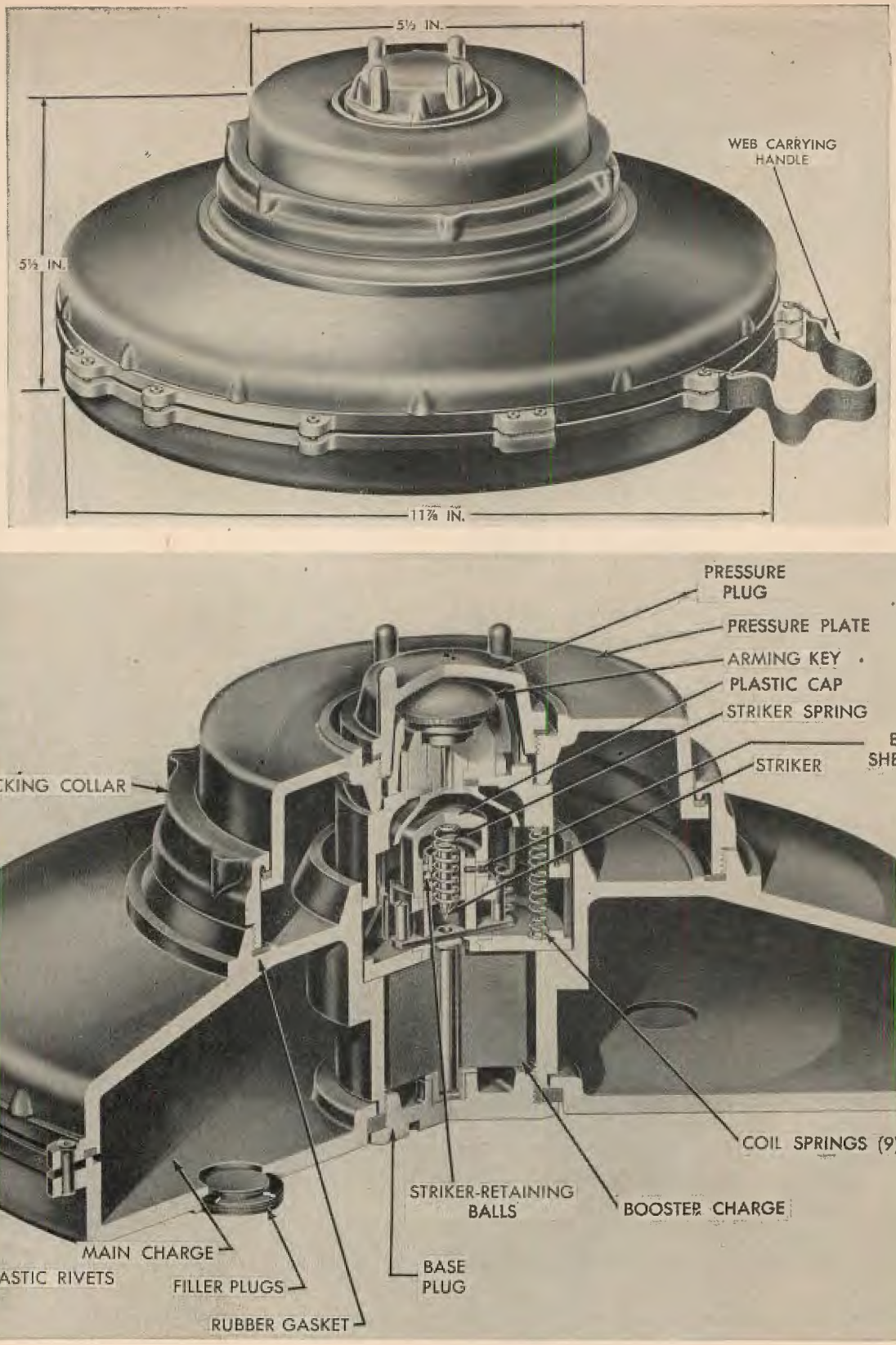


Figure 107. Italian bakelite antitank mine, type II.

A (armed). A bakelite pressure plug screws into the center of the pressure plate and provides access to the arming key. The joint is sealed with a rubber gasket.

b. Employment. This mine is laid in areas being abandoned to the opposing force, because it is difficult to detect and neutralize.

c. Functioning.

(1) A pressure of 300 pounds applied to the pressure plate forces the upper part of the fuze assembly downward, compressing the nine coil springs and shearing the two brass shear pins.

(2) When the plastic cap has moved downward 3/16 of an inch, the two striker-retaining balls escape into the recess in the upper part of the plastic cap, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Unscrew the base plug, insert a percussion-cap-and-detonator assembly in the booster charge, insert the booster charge in the mine, and replace the base plug.

(2) Place the mine in a hole so the pressure plate will be flush with or slightly below the surface of the ground.

(3) Unscrew the pressure plug.

(4) Turn the arming key from *S* (*sicure:* safe) to *A* (*armato:* armed) and remove the key.

(5) Replace the pressure plug.

e. Neutralizing.

(1) Examine the mine for trip wires and booby traps.

(2) Remove the mine from the hole.

(3) Unscrew the base plug and remove the booster charge.

(4) Remove the percussion-cap-and-detonator assembly from the booster charge.

Note. The fuze assembly is locked in the armed position and cannot be neutralized without the arming key.

Section II. ANTIPERSONNEL MINES

84. Italian Antipersonnel Picket Mine

a. Description. The Italian antipersonnel picket mine (fig. 108) consists of a cylindrical metal case, 1½ inches in diameter and 7½ inches long, surrounded by a steel fragmentation coil. The top of the cylindrical case is closed by a threaded cap. On the top of the cap is a housing for a spring-loaded striker. The striker is held in a cocked position by a striker-retaining pin which is provided with a loop on one end for attaching a trip wire. The striker handle facilitates cocking the striker and holds the striker in place when unarmed with the striker-retaining pin removed. On the underside of the threaded cap is riveted a stirrup-shaped holder. A black tube is located in the center of the holder. Passing diametrically through the sides of the threaded cap is a percussion-cap holder. The percussion-cap holder is withdrawn to insert the percussion cap. The detonator is positioned immediately beneath the percussion cap in the main charge. The mine weighs 1.75 pounds including 3.5 ounces of explosive. It is mounted on a 10-inch wooden picket.

b. Employment. This mine is employed in unit security against infantry, and in antitank mine fields to hinder breaching and reconnaissance parties of an opposing force.

c. Functioning. A pull on the trip wire attached to the loop of the striker-retaining pin releases the spring-loaded striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Drive the wooden picket into the ground leaving 2 inches of the picket exposed.

(2) Unscrew the threaded cap on the top of the mine case, place a charge in the mine, and mount the mine on the wooden picket.

(3) Insert a detonator into the charge and screw on the threaded cap.

(4) Cock the striker by pulling out the striker shaft and inserting the striker-retaining pin in the exposed hole in the striker shaft.

(5) Pull the percussion-cap holder out and insert a percussion cap in the hole provided in the holder.

(6) Connect an anchored trip wire to the loop of the striker-retaining pin.

(7) Position the percussion cap in the armed position by pushing in the percussion-cap holder.

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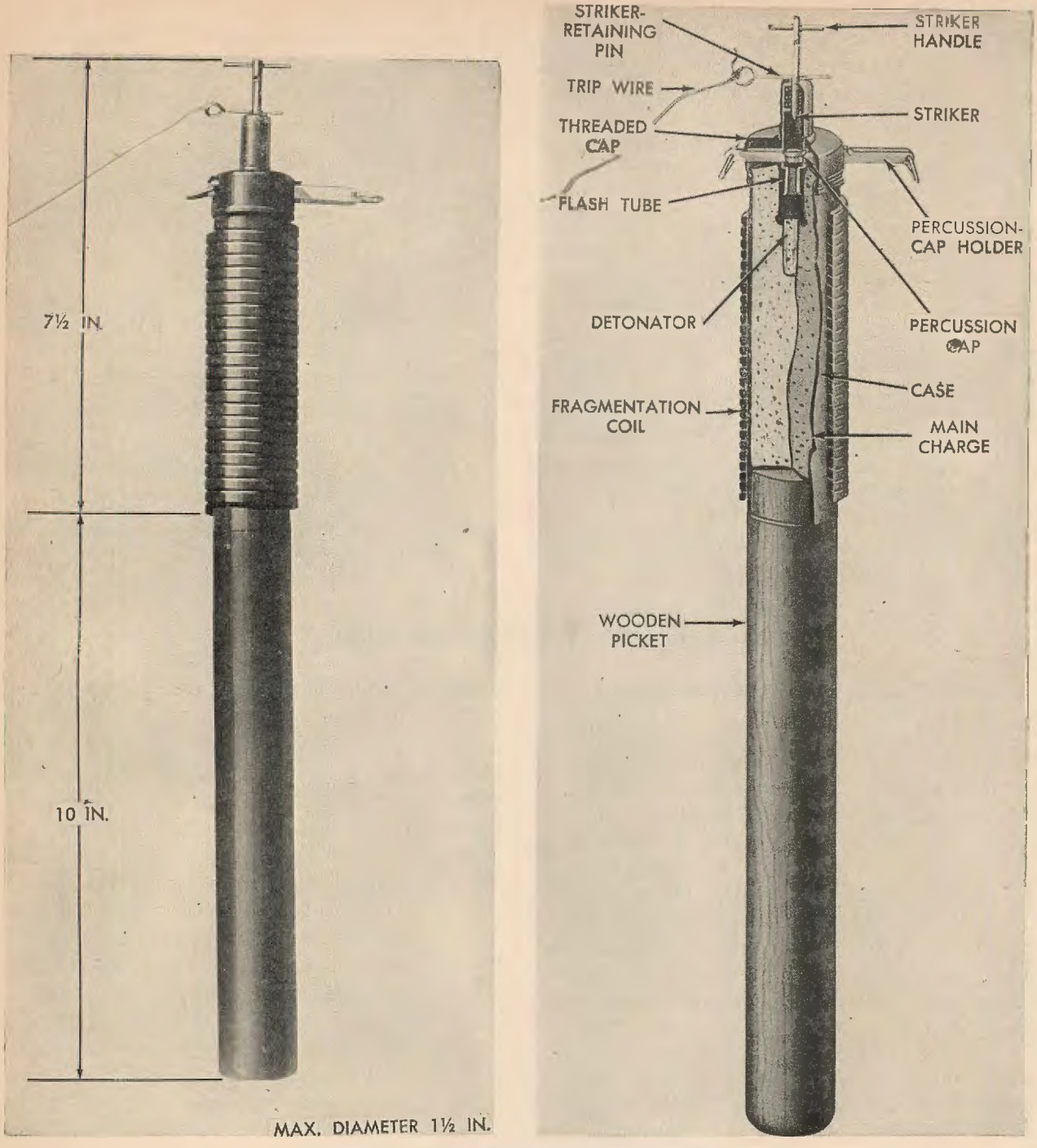


Figure 108. Italian antipersonnel picket mine.

e. Neutralizing.

(1) Pull the percussion-cap holder to the side and remove the percussion cap.
(2) Cut the trip wire attached to the striker-retaining pin.
(3) Unscrew the threaded cap and remove the detonator.
(4) Hold the striker shaft firmly and remove the striker-retaining pin; lower the striker shaft gently.
(5) Replace the threaded cap.
(6) Remove the mine from the wooden picket.

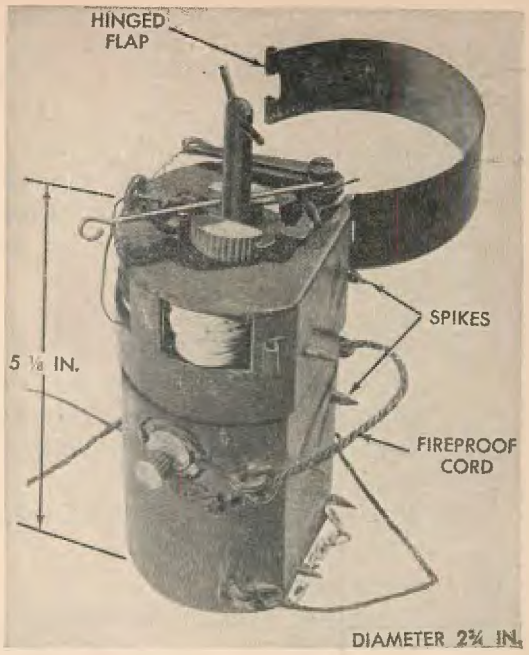
f. Packing. The mines are packed in wooden boxes, 20 mines to a box with 20 wooden pickets and a mallet.

85. Italian B–4 Antipersonnel Mine

a. Description.

(1) *Mine.* The Italian B–4 antipersonnel mine (fig. 109) consists of two concentric steel cylinders with a common base and a superimposed top cover. The mine is 2¾ inches in diameter and 5⅛ inches high. Six spikes are located in a flattened portion of the outer cylinder. The six spikes are used to place the mine against a tree or post. Two lengths of fireproof cord are provided. This cord can be attached to the mine case to aid in holding the mine to a tree or post. A brass fuze housing extends through the inner cylinder. The space between the fuze housing and inner cylinder is filled with 0.25 pound of explosive. The space between the inner and outer cylinders is filled with metal fragments. A percussion-cap holder is inserted diametrically through the side of the mine case. The booster charge and detonator are inserted in a well in the bottom of the fuze housing. The well is closed by a base plug. The base plug is attached to the outer cylinder by a chain. Trip wires are wound on spools and carried in recesses in the top portion of the mine. A hinged flap, held closed by a pin, covers the recesses. The pin also serves as a safety pin when arming the mine. When inserted in the hole provided in the striker shaft, the pin prevents any movement of the striker. An auxiliary firing mechanism is also provided on some B–4 mines. It consists of a spring-loaded actuating lever held cocked by a taut trip wire. The total weight of the mine is 3 pounds.

(2) *Firing mechanism.* The firing mechanism is a trip release type. A spring-loaded striker is screwed into the top of the fuze by means of a brass slotted collar. The brass slotted collar and striker shaft are grooved to receive an actuating key which holds the striker in a cocked position. The actuating key is slotted and has a circular hole at one end large enough in diameter to clear the striker shaft. Trip wires are con-



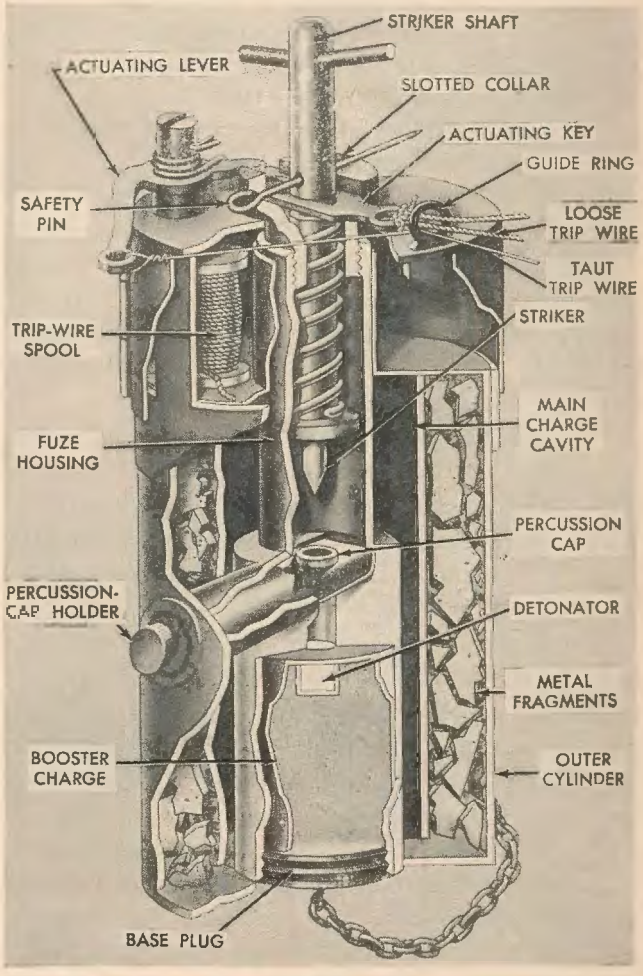


Figure 109. Italian B–4 antipersonnel mine.

nected to a ring on the actuating key and pass through a guide ring on the cover of the mine:

b. Employment. This mine is employed in antitank mine fields in an irregular line in front of the field. It is also employed in antipersonnel mine fields and wire obstacles in combination with other mines.

c. Functioning.

(1) *Slack trip wire.*

(*a*) A pull on the slack trip wire pulls the actuating key away from the striker shaft permitting the striker shaft to slip through the circular hole in the actuating key.

(*b*) The released striker sets off the percussion cap, firing the mine.

(2) *Taut trip wire.*

(*a*) Cutting or breaking the taut trip wire releases the spring-loaded actuating lever against the actuating key.

(*b*) The actuating key is pushed outward until the striker shaft slides through the circular hole in the key.

(*c*) The released striker sets off the percussion cap, firing the mine.

d. Installing and Arming. Although the mine may be buried, the maximum effect against personnel is obtained when the mine is installed above the ground. The mine may be installed by either one or a combination of the two methods described below:

(1) *Slack trip wire.*

(*a*) Attach the mine to a tree, post, or wooden object.

(*b*) Anchor the slack trip wires and attach them to the actuating key passing them through the guide ring. Use enough trip wires to cover the mined area.

(*c*) Cock the striker by pulling out the striker shaft and insert a safety pin in the exposed hole. The pin in the hinged flap can be used as a safety pin.

(*d*) Push the actuating key to engage the striker shaft.

(*e*) Insert a percussion cap in the percussion-cap holder and push the holder into place.

(*f*) Attach a cord to the safety pin and, from a safe distance, remove the pin.

(2) *Taut trip wire.* If a taut trip wire is to be used, anchor one end of the wire, thread it through the guide ring, and attach the other end to the eye in the actuating lever. Adjust the tension in the wire so as to have a ¼-inch space between the actuating key and the actuating lever. The remaining steps are as described in (1) (*c*) through (*f*) above.

e. Neutralizing.

(1) Insert a safety pin into the hole in the striker shaft.

(2) Remove the percussion cap from the mine by removing the percussion-cap holder.

(3) Disengage the actuating key from the striker shaft.

(4) Uncock the striker by removing the safety pins and gently lowering the striker shaft.

(5) Cut the trip wires.

f. Packing. Twenty-one mines are shipped in a wooden box 25½ inches by 5 inches by 8 inches. Each mine is complete except for a percussion cap.

86. Italian V–5 Antipersonnel Mine

a. Description. The Italian V–5 antipersonnel mine (fig. 110) consists of a long, tubular steel case supported on springs in a sheet-steel box open at the top. The mine is 46 inches long and 2½ inches high, and weighs a total of 11.75 pounds, including 2 pounds of explosive. The steel case is 2 inches in diameter. A built-in fuze with a spring-loaded striker is located at each end of the mine, with the main charge between the two strikers. The firing mechanism is very similar to that of the antitank V–3 mine (par. 76). The striker shaft has shoulders near both ends and a safety-pin hole in the outer end. Over the outer end of the striker shaft is a sleeve-like cocking tube with grips used to cock the striker. A spring-steel loaded sear retains the striker in the cocked position by engaging the shoulder on the inner end of the striker shaft. An actuating pin is inserted through a hole in the case and passes through a hole in the sear. The actuating pin rests on the open end of a U-shaped spring clip which fits around the fuze housing. The spring clip, in turn, rests on an actuating bolt attached to the

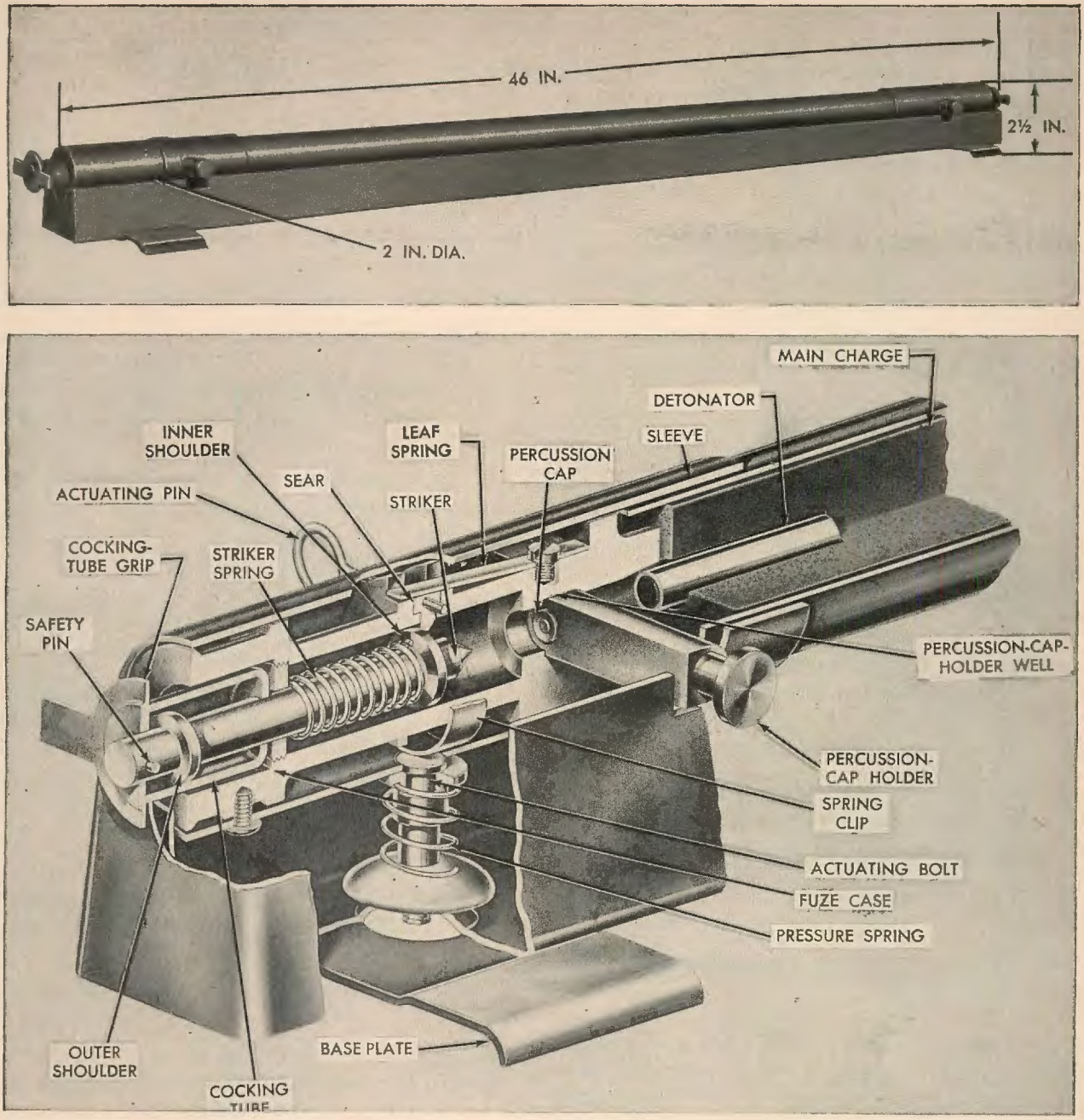


Figure 110. Italian V–5 antipersonnel mine.

bottom of the mine case. A removable percussion-cap holder is provided for the insertion of a percussion cap.

b. Employment. This mine is employed in much the same way as the Italian V–3 antitank mine. The length of the mine makes it very desirable for use in roads, trails, and passes.

c. Functioning.

(1) A pressure of 44 pounds on the case depresses the pressure spring around the actuating bolt, forcing the actuating bolt upward on the U-shaped spring clip.

(2) The U-shaped spring clip is forced upward against the actuating pin, raising the sear.

(3) The sear frees the spring-loaded striker, which sets off the percussion cap, firing the mine.

d. Installing and Arming.

(1) Withdraw the percussion cap holders and the actuating pins.

(2) Cock the striker of each fuze by pulling outward on the cocking-tube grips.

(3) Push the cocking tubes all the way in and insert a safety pin in the hole in the end of the striker shafts.

(4) Place the mine in a hole so the top of the mine is flush with the top of the ground.

(5) Insert the actuating pins.

(6) Insert the percussion-cap holders, with percussion caps, in the openings in the side of the mine.

(7) Withdraw the safety pins.

e. Neutralizing. This mine is extremely dangerous. If it has been exposed to artillery fire or other blasts, it should be destroyed in place. If it is absolutely necessary to neutralize the mine, proceed as follows:

(1) Examine the mine for trip wires and booby traps.

(2) Insert nails or safety pins in the holes in the end of the striker shafts.

(3) Remove the actuating pins.

(4) Remove the percussion-cap holders.

(5) Re-insert the actuating pins.

(6) Uncock the strikers by grasping the cocking-tube grips, lift up slightly on the actuating pins, and let the strikers go forward gently.

87. Italian 1-Pound Antipersonnel Mine (Wooden)

a. Description. The Italian 1-pound antipersonnel mine (wooden) (fig. 111) consists of a wooden case 5½ inches long, 2½ inches wide, and 1½ inches high, with a hinged pressure lid overlapping the case. The pressure lid has a slot cut in the center of the front edge to fit over the pull type fuze so the sides of the slot rest on the wings of the striker-retaining pin. The main charge, a standard 150-gram block of explosive, is surrounded by steel fragmentation plates. The pull type fuze has a spring-loaded striker retained in the cocked position by a striker-retaining pin. A removable cocking ring is provided in the end of the striker shaft. The safety pin is inserted in a hole located in the striker shaft in such a way as to cause the safety pin to bear against the outside of the pressure lid. When laid on top of the ground, the mine has an effective casualty radius of 3 to 5 yards.

b. Employment. This mine is laid along paths, trails, and road shoulders, and in antitank mine fields.

c. Functioning. Pressure of 1 to 5 pounds on the pressure lid pushes the striker-retaining pin out of the fuze, releasing the spring-loaded striker against the percussion cap and firing the mine.

d. Installing and Arming.

(1) Cock the fuze by pulling out on the cocking ring and inserting the striker-retaining pin in the second hole exposed in the striker shaft.

(2) Place a safety pin in the safety-pin hole.

(3) Screw a percussion cap and detonator onto the fuze, using the percussion-cap-and-detonator holder.

(4) Insert the fuze in the mine so the detonator projects into the detonator well provided in the main charge.

(5) Turn the striker shaft so the wings of the striker-retaining pin are horizontal and below the striker shaft.

(6) Gently lower the pressure lid so the fuze slot fits over the fuze and the edge of the lid rests on the wings of the striker-retaining pin.

(7) From a safe distance of 50 yards, remove the safety pin by means of a rope or wire.

e. Neutralizing.

(1) Insert a safety pin or nail in the safety-pin hole.

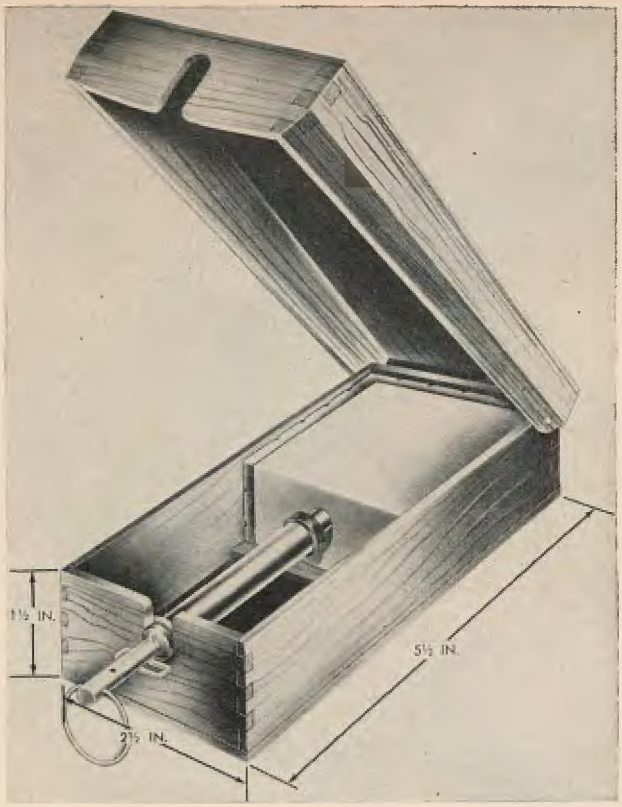
(2) Raise the pressure lid.

(3) Holding the striker-retaining pin in place, unscrew the fuze.

(4) Remove the detonator and the percussion cap.

88. Italian 1-Pound Antipersonnel Mine (Bakelite)

The Italian 1-pound antipersonnel mine (bakelite) (fig. 112) is identical to the 1-pound antipersonnel mine (wooden) (par. 87) except for the bakelite material in the case and the shape of the pressure lid.



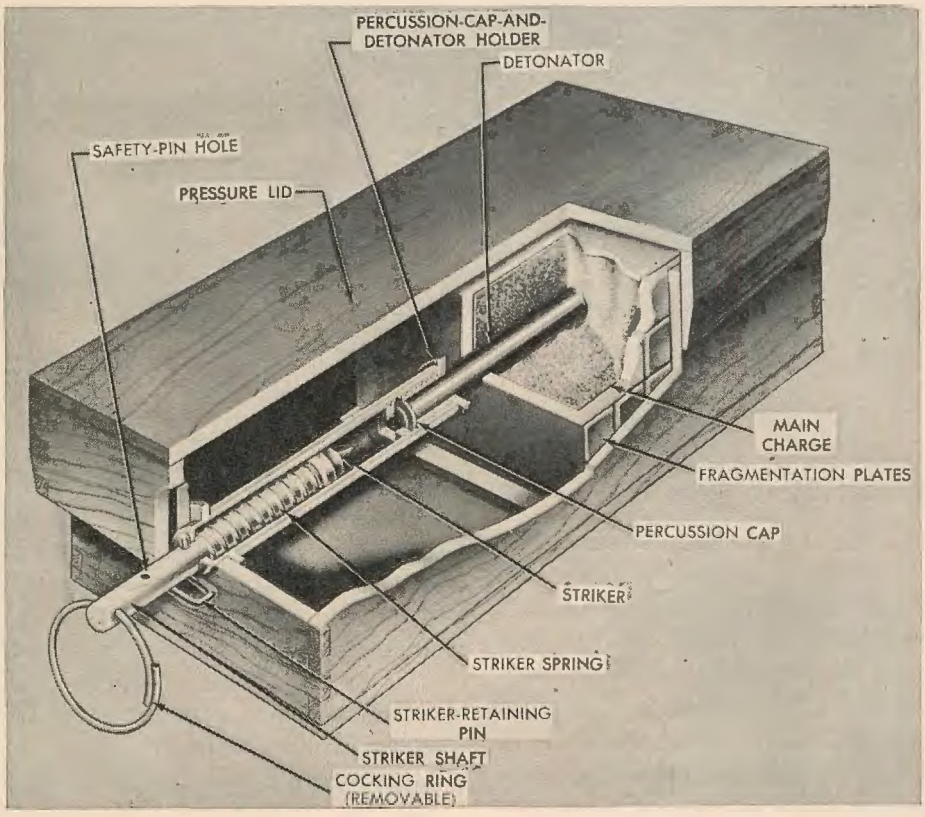


Figure 111. Italian 1-pound antipersonnel mine (wooden).

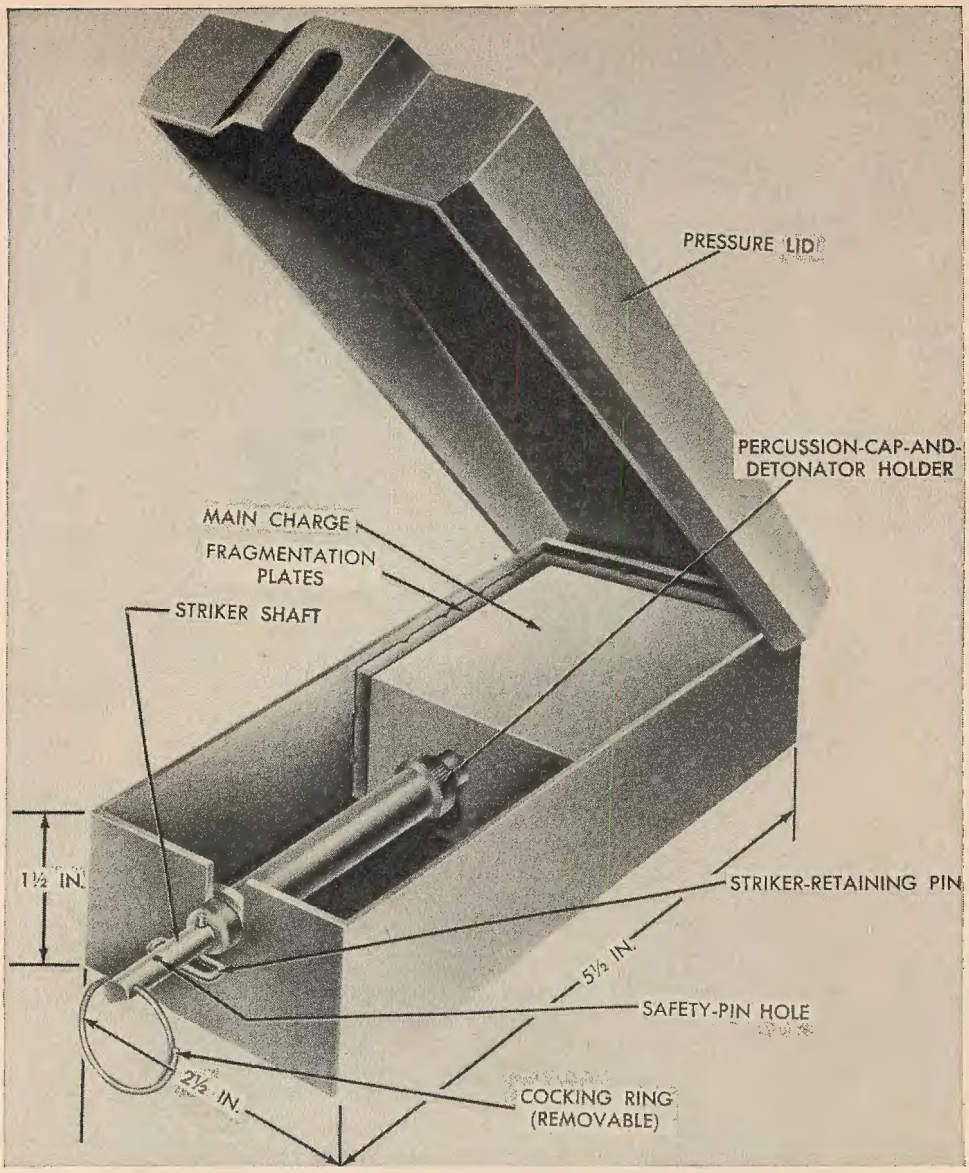
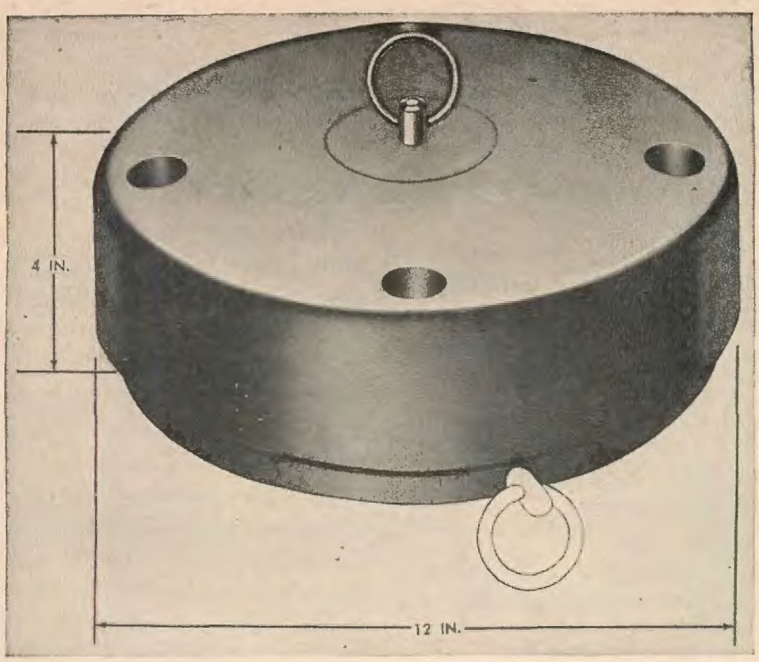


Figure 112. Italian 1-pound antipersonnel mine (bakelite)

Section III. RAILWAY MINES

89. Italian Railway Mine, Type I

a. Description. The Italian railway mine, type I (fig. 113) is 12 inches in diameter and 4 inches high and consists of a bottom and top section both of which are light-alloy castings. The top section, which serves as a pressure cover, overlaps the bottom section and is attached to it by four stud bolts. Each stud bolt is surrounded by a pressure spring upon which the top section rests. The main charge consists of 8 to 9 pounds of explosive. A percussion-cap-and-detonator assembly is screwed into a detonator holder in the center of the bottom of the mine. Half of a cartridge of explosive is fixed around the detonator to act as a booster charge. The striker is located in the center of the top section and consists of a pointed steel rod screwed through the top section so as to project inside the pressure cover. The striker shaft has a carrying ring on its outer end. In the safe position, the striker shaft is screwed into a tapped hole in the side of the bottom section. The ring in the striker shaft aids in carrying the mine.



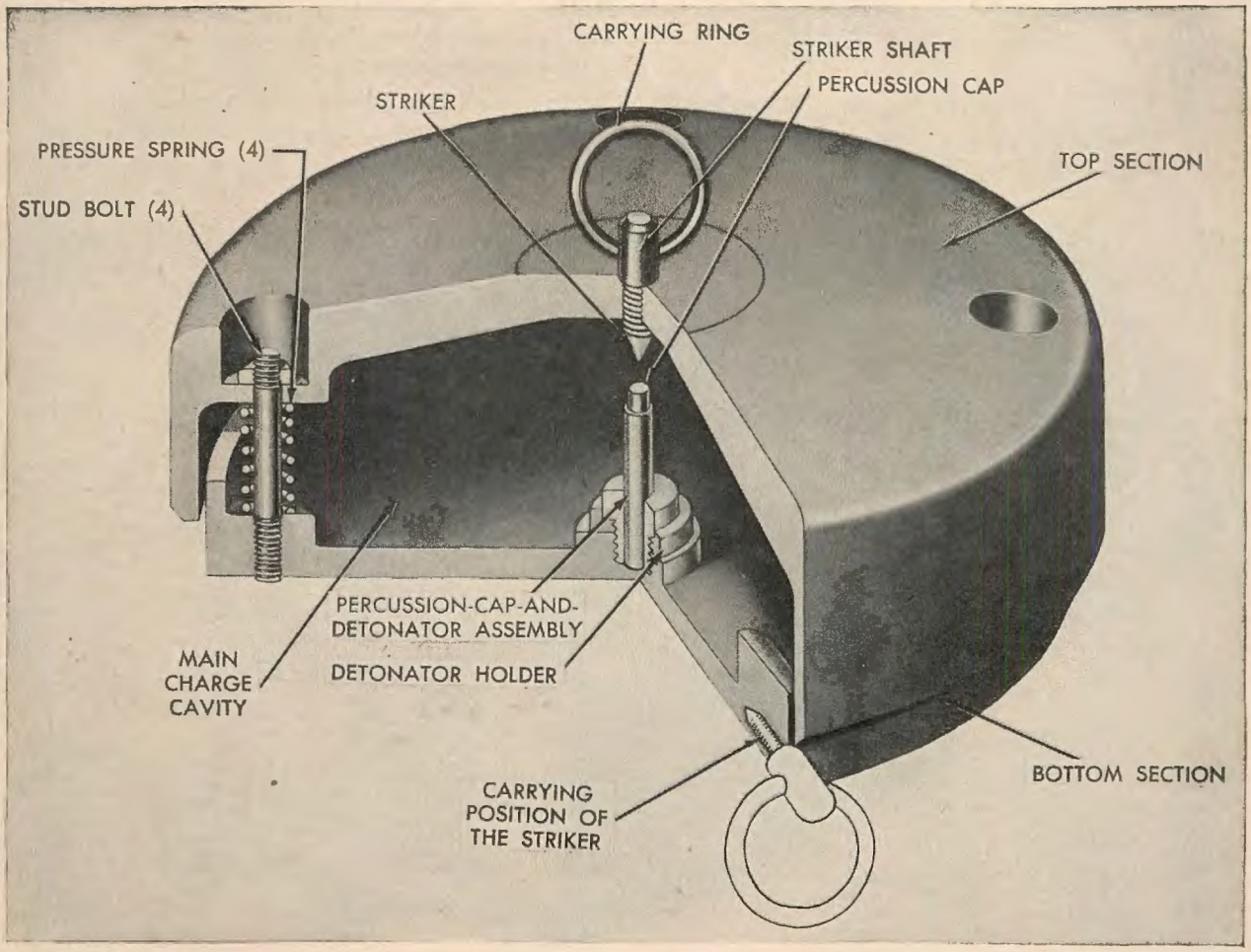


Figure 113. Italian railway mine, type I.

b. Employment. The mine is laid under a railroad tie or rail. Because of the low actuating pressure, the mine can be used for other purposes.

c. Functioning. Pressure of 30 to 40 pounds on the top section forces the top section down and forces the striker against the percussion cap, firing the mine.

d. Installing and Arming.

(1) Remove the top section by unscrewing the four stud bolts.
(2) Screw the percussion-cap-and-detonator assembly into the detonator holder in the bottom section.
(3) Place half of a cartridge of explosive around the percussion-cap-and-detonator assembly as a booster charge.
(4) Replace the top section.
(5) Remove the striker shaft from the carrying position and screw it into the top of the top section.

e. Neutralizing.

(1) Unscrew the striker shaft from the center of the top section.
(2) Remove the top section.
(3) Remove the half cartridge of explosive from its location over the percussion-cap-and-detonator assembly.
(4) Very carefully remove the percussion-cap-and-detonator assembly from the detonator holder.
(5) Replace the top section.

90. Italian Ratchet Railway Mine

a. Description. The Italian ratchet railway mine (fig. 114) consists of a rectangular aluminum case, containing the main charge, placed on top of another aluminum case containing the ratchet firing mechanism. The two cases are fastened together by spring-loaded stud bolts on each end of the mine. For carrying, the mine is mounted on a wooden base with hinged wooden flaps and a leather carrying strap passing over the mine, connecting the flaps. The mine measures 12 inches by 9 inches by 6 inches and weighs 26 pounds, including 5.1 pounds of explosive. The ratchet firing mechanism consists of a pivoted brass lever arm, an air-valve governor, and a cogwheel. Applications of pressure on the mine case are transmitted to the lever arm by a spring-loaded plunger. An air-valve governor is coupled on the rear end of the lever arm to assure a definite pause between successive operations of the lever arm. A spring-loaded pawl on the forward

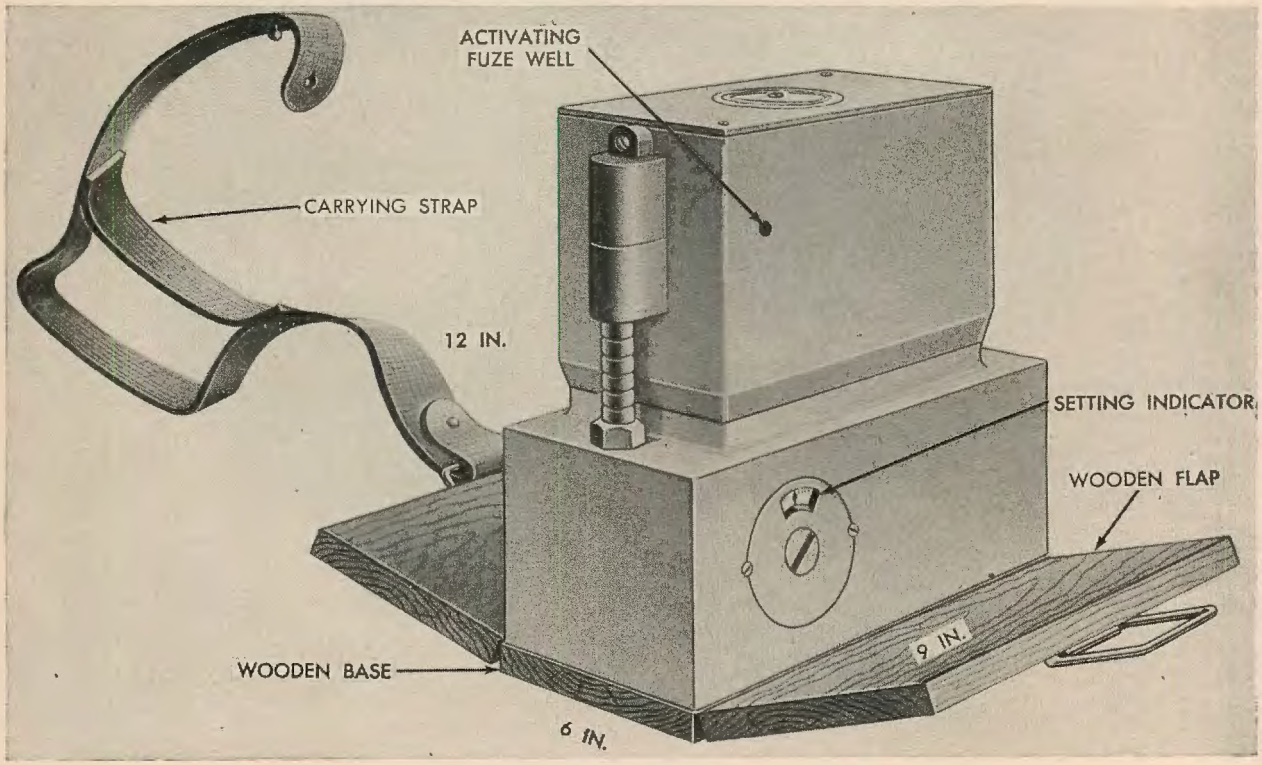


Figure 114. Italian ratchet railway mine.

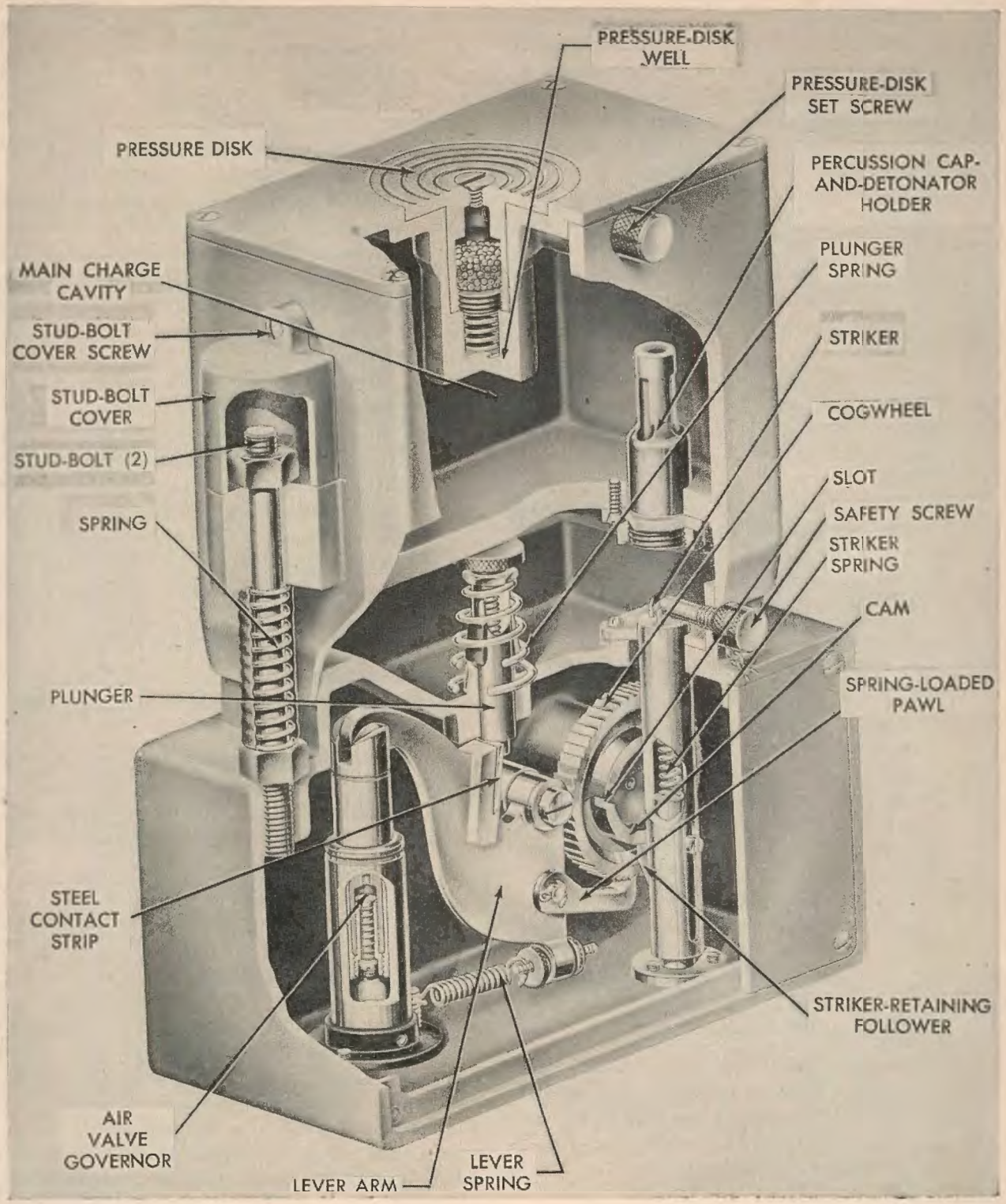


Figure 114—Continued.

end of the lever arm drives the cogwheel. A striker-retaining follower rides on a cam of the cogwheel and retains a spring-loaded striker. The cam has a slot notched in it to release the striker after the mine case has been depressed a set number of times. Coupled with the cogwheel is a setting indicator which can be set from 1 to 59, corresponding to the number of cogs on the cogwheel. The slot in the cam corresponds to the zero setting on the indicator. The mine is also provided with a percussion-cap-and-detonator holder for insertion of a detonator and percussion cap. A safety screw located on the side of the mine case holds the striker in the safe position. One activating fuze well is provided in the side of the mine case.

b. Employment. This mine was designed for use under railroad ties or rails, but it can also be employed on main roads and on bridge sites where there is heavy traffic.

c. Functioning.

(1) Pressure on the top of the mine moves the top case down, depressing the plunger which depresses the lever arm.

(2) The lever arm actuates the spring-loaded pawl, which moves the cogwheel one cog.

Note. The setting on the setting indicator corresponds with the number of cogs remaining on the cogwheel before the spring-loaded striker is released. When the setting reaches zero, the striker-retaining follower is opposite the slot in the cam on the cogwheel.

(3) When the striker-retaining follower is opposite the slot in the cam, the spring-loaded striker is released against the percussion cap, firing the mine.

Note. Tests show that 5 seconds are required to fully depress the lever arm and move the cogwheel one cog due to the delay action of the air-valve governor. Therefore, vehicles passing over the mine at 30 miles per hour would have to be over 75 yards apart, and trains would have to be traveling at 15 miles per hour, or less, to move the cogwheel more than one cog.

d. Installing and Arming.

(1) Remove the stud-bolt covers and the nuts on the stud bolts.

(2) Lift off the top case of the mine and check to see that the safety screw is in place.

(3) Insert a detonator and percussion cap in the percussion-cap-and-detonator holder.

(4) Set the setting indicator for the desired cogwheel setting. The indicator may be set from 1 to 59.

(5) Replace the top case of the mine and place the mine in position.

(6) Adjust the height of the pressure disk on top of the mine by loosening the pressure-disk set screw, removing the pressure disk, and placing lead shot in the cavity at the base of the pressure-disk well. Replace the pressure disk. It should rest flush with the bottom of the railway tie or rail.

(7) Remove the safety screw.

e. Neutralizing.

(1) Search for and neutralize any activating fuzes.

(2) Insert a ¼-inch nail or plug into the safety-screw hole.

(3) Remove the mine from its position.

(4) Remove the stud-bolt covers and the stud-bolt nuts.

(5) Lift off the top case of the mine.

(6) Remove the percussion cap and detonator.

Section IV. BOOBY TRAPS AND MINE DETECTING EQUIPMENT

91. Italian Headset Booby Trap

The Italian headset booby trap (fig. 115) consists of a small powdered explosive charge packed around an electric detonator placed inside an earphone. It is intended to fire when placed over the ear for normal operations.

92. Italian Mine Detector 565

a. Description. The Italian mine detector 565 (fig. 116) is the heterodyne type. It consists of an oscillator-amplifier unit, a pack case, a search head, an extension handle, a headset, and a control box. The search head is a heart-shaped, tubular coil with an extension handle attached to it. The control box is attached to the end of the extension handle. The power supply, oscillator-amplifier unit, headset, and a screw driver are carried in an aluminum pack case. Sockets are provided on the side of the pack case for insertion of the search-head cable and headset cable. In the normal operating position, the pack case is carried

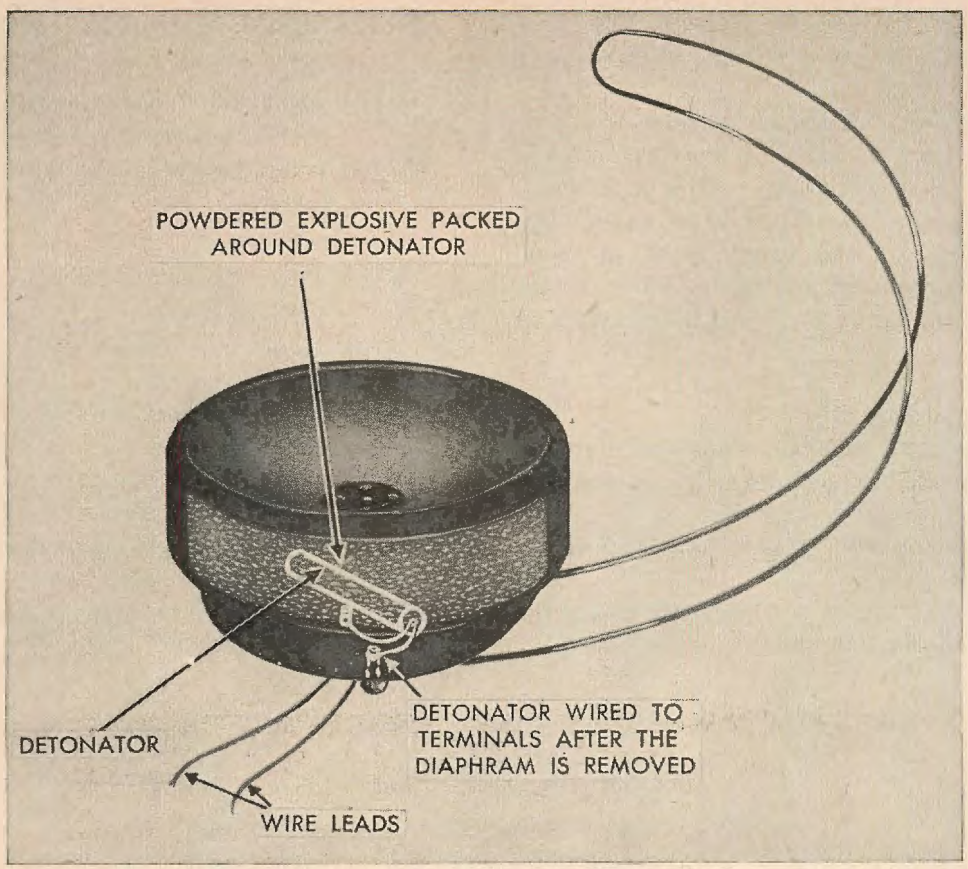


Figure 115. Italian headset booby trap.

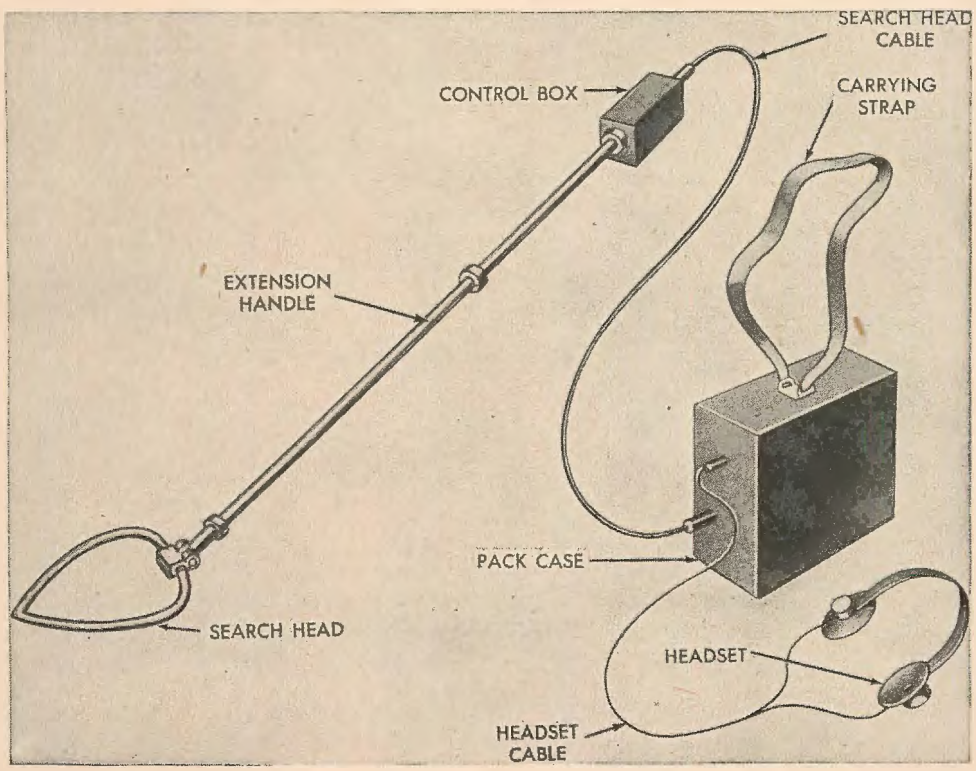


Figure 116. Italian mine detector 565.

on the operator's back with a carrying strap. The entire detector set is stored in a plywood shipping case when not in use.

b. Functioning. This mine detector works on a beat-frequency principle. A fixed oscillator in the pack case is synchronized with a variable oscillator in the search head to give an audible signal. Proximity of the search head to metal changes the inductance of the oscillator in the search head, producing a change in the pitch of the signal.

c. Operation.

(1) *Assembling.*

(*a*) Remove the extension-handle pieces, control box, search head, and pack case from the shipping case.

(*b*) Assemble the search head and extension handle.

(*c*) Attach the control box to the end of the extension handle.

(*d*) Remove the headset, headset cable, and screw driver from the pack case.

(*e*) Plug the search-head cable into the control box and pack case.

(*f*) Plug the headset cable into the pack case.

(2) *Operating.*

(*a*) Turn the switch on the control box about halfway.

(*b*) Insert the screw driver through the hole in the back of the pack case and turn the metal core until no signal is obtained. Then adjust for maximum sensitivity by turning the metal core until the signal is halfway between an audible beat note and silence.

d. Sensitivity. This mine detector has poor sensitivity and will not detect small metallic objects.

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